FANNING THE FLAMES

How the European Union is fuelling a new arms race

ENAAT
european network against arms trade

tni
transnational institute

✉ **Subscribe to our newsletter:**
www.tni.org/en/subscribe

or scan the QR code:

CONTENTS

EXECUTIVE SUMMARY

'If you prepare for war you get war.
If you prepare for peace you get peace.'
– Ukrainian peace activist Yurii Sheliazhenko

At the time of writing in March 2022, a war has broken out in eastern Europe following the illegal invasion of Ukraine by Russian troops. Towards the end of 2021 unrest in the Balkans came close to boiling point. Tensions in the South China Sea continue to simmer and threaten regional and global stability. Wars and violence continue in Afghanistan, in Central Africa, Iraq, several countries across the Sahel, Syria, and Yemen among other countries and regions experiencing constant violence and consequent displacement. Some of the world's most powerful nations are sabre-rattling, drafting and deploying troops, stockpiling military materiel, and actively preparing for war – including the European Union (EU) and some of its member states. Contrary to the EU's founding principle of promoting peace, it too has been charting a course to establish itself as a global military power. History has shown, however, that far from contributing to stability and peace, militarism fuels tension, instability, destruction and devastation.

In a 'watershed moment', in response to the war in Ukraine, the EU announced that it would, for the first time, fund and supply lethal weapons to a country under attack through the European Peace Facility (EPF). While this move is unprecedented, it is not unexpected. The EU has been pursuing a military path since the entry in to force of the Lisbon Treaty in 2009, which provides the legal underpinning to create a common security and defence policy. Less than a decade later, in a new point of departure, the EU created specific budget lines to allocate funding to military-related projects. This decision firmly set the EU on a new and deeply worrying trajectory, where international political and social problems were to be addressed not only through dialogue and diplomacy, but also through the threat of military solutions.

The **European Defence Fund (EDF 2021–2027) has a budget of €8 billion** for the research and development (R&D) of military materiel. Since it is too early to analyse the impact of the EDF, which is still being developed, this report looks at its two precursor programmes: the **Preparatory Action for Defence Research (PADR 2017–2019) with a budget of €90 million to fund defence research,** and the **European Defence Industrial Development Programme (EDIDP 2019–2020)** with a budget of €500 million to fund the development of defence equipment and technology. Under these budget lines, almost €600 million of European public money was granted to highly lucrative private companies producing and exporting arms and military technologies, as well as private research centres among other beneficiaries. These pilot projects expose deeply worrying trends with regard to European-driven militarism, which if replicated under the **EDF, with a total budget that is 13.6 times that of the precursor programmes,** could potentially lead to catastrophic results. By increasing the funding for military R&D by a massive 1250% from one budgetary cycle to another, the EU is now increasingly intent on investing in military hardware and advanced technologies rather than in building or maintaining peace.

The objective of these budget lines is to **research and develop new weaponry,** as well as to **enhance existing armaments, integrating new technology such as artificial intelligence (AI), unmanned or autonomous systems.** In particular, the funds promote the development of 'disruptive technologies', which would, were they to be deployed, **radically change the conduct of war.** After the evolution of gunpowder and nuclear weapons, conflict analysts refer to the current period as a third evolution in the arms race, in which automated weaponry is being tried and tested and may eventually be part of conventional arsenals, despite serious unresolved legal and ethical questions. In allocating billions of euros for the development of new defence technology, the **EU is fuelling a third and deeply troubling arms race,** which may eventually render obsolete the existing rules of war and International Humanitarian Law (IHL).

Both the EU funding calls and the arms-producing companies use the same language of collaborative defence, interoperability, industrial competitiveness, enterprise, and innovation, with no regard for the instability, death and destruction that will certainly result if such weapons and military technology are deployed. But wars never occur in a vacuum, but are the manufactured outcome of many years of political strategies and decisions. In choosing to invest in innovative weaponry, the EU is not merely implementing a defensive strategy in the unlikely event that one of its member states might be attacked, it is driving militarism, actively fuelling a very dangerous arms race, and fanning the flames of war.

This report reveals that:

EU decision-making processes and budgets have been captured by highly lucrative corporations that exploit these political spaces for their own gain, exposing the pervasive influence of arms-trade lobbyists in setting the EU's agenda.

- **Nine of the 16 representatives in the Group of Personalities on Defence Research,** which was set up by the European Commission (EC) in 2015, **were affiliated with arms companies, arms research institutes** and an **arms industry lobby organisation.** The six arms companies are **Airbus, BAE Systems, Indra, Leonardo, MBDA,** and **Saab,** two arms research institutes, **Fraunhofer** and **TNO,** and the arms industry lobby organisation, **AeroSpace and Defence Industries Association of Europe.**

- The **EC proposal** that eventually led to the establishment of the EDF was **based on a report presented by the Group of Personalities, which included terminology that was copied verbatim from the Group of Personalities report in to the EC defence fund proposal.**

- The entities they represented stood to make massive profits from the budget lines they were influential in creating. Concretely, **those who participated in the Group of Personalities have to date received over €86 million or 30.7% of the allocated budget,** although since the entire allocation has not yet been made public, they are likely to receive even more funding.

The EU is funding arms companies that are involved in highly questionable practices that fall far short of upholding human rights standards and the rule of law, two of the EU's core values. That the EU would knowingly invest European public money in entities that are involved in dubious and highly controversial arms deals, producers of nuclear weapons, or have faced allegations of corruption, raises serious questions regarding the standards the EU applies before granting hundreds of millions in military spending.

- Concretely, the seven largest beneficiaries of this EU budget line **are involved in highly controversial arms exports to countries experiencing armed conflict or where authoritarian regimes are in place and human rights violations are commonplace.**

- By funding these beneficiaries, the **EU is indirectly funding nuclear armaments,** given that many of the companies are also involved in the development, production, and maintenance of nuclear weapons.

- Furthermore, five of the eight **largest beneficiaries faced substantial allegations of corruption in recent years,** namely **Airbus, Leonardo, Safran, Saab** and **Thales.**

Although not all of the information regarding funds granted under PADR and EDIDP is yet available, the **EU currently finances 62 military research and innovation projects with a total of €576.5 million** (the total is closer to €600 million including administrative and internal costs).

- To date, **68.4% of the budget goes to companies based in France, Germany, Italy and Spain.**

- These are the nations where the largest arms companies are headquartered and the EU member states with the largest volume of arms exports.

- Companies from these four countries **coordinate 42 of the 62 projects (67.7%).** France alone receives 26.4% of the funding allocated.

- Italian arms giant, **Leonardo,** the largest arms company in the EU, is the largest single recipient with €28.7 million. Other companies in the top five (including their subsidiaries across the EU), are Spanish company, **Indra** (€22.78 million), and French companies, **Safran** (€22.33 million), **Thales** (€18.64million) and the trans-European company **Airbus** (€10.17million).

- Almost half of EU member states receive less than 1% of the funding.

- These funding lines not only promote the R&D phases of the defence industry, but **actively call for EU countries to then purchase the arms and related technologies, add them to their defence arsenal, or promote their export beyond Europe.** The result will be highly sophisticated armies inside the EU and its enlargement as a global military power, as well as armed forces in those countries whose military capacity has been beefed up through European arms exports.

- The combined military sales of the eight largest beneficiaries of the EU budgets analysed came to over US$42 billion in 2020, confirming that the **EDF primarily serves to subsidise Europe's largest and most profitable arms companies.**

The checks applied to approve the funding of novel lethal weaponry **fall far short of even the most basic legal and ethical standards** such that the equipment, if eventually deployed, may threaten to permanently shift the conduct of war.

- Our report focuses on projects related to four specific clusters of equipment: (1) disruptive defence and protection; (2) disruptive tools for defence; (3) non-disruptive defence tools; and (4) disruptive combat systems.

- At least 22 of the 34 projects aim to develop disruptive tools, which could be used in defence or in combat. The development or use of **unmanned systems is included in at least 12 of the 34 projects.** The use of **AI as a disruptive tool is part of at least six projects.** While the research and development of entirely autonomous lethal weapons is not yet permitted under EU budget lines, other automated weapons, autonomous systems and controversial technologies are being developed, and there are fears that this may eventually lead, perhaps unwittingly, to approving funding for weapons such as 'killer robots'. These developments have taken place with no meaningful debate about the serious legal and ethical implications of deploying 'smart' weaponry.

- The EU's legal and ethical risk assessment procedure mainly relies on **self-assessments by applicants** (mainly corporations) for EU funding. These assessments are effectively a **box-ticking exercise.** Responsibilities held by state parties under International Humanitarian Law (IHL) are being shifted to private third-party funding applicants which may lead to the **de facto deregulation of potentially one of the deadliest pools of money from Brussels.** Attempts by civil society to obtain further information on these procedures were inadequately addressed and information was deliberately withheld, raising serious concerns about transparency and democratic oversight.

- The kinds of technologies being funded **may lead to violations of EU and international law** once they become operational. Evidence shows that even when human beings are involved, those programming or operating technical equipment are far more likely to be predisposed to, or influenced by, automation bias and computer-generated knowledge rather than seeking out alternative verification. In the past this has led to armed forces mistakenly downing their own or allied fighter jets. The EU's Ombudsman's Office found it to be of concern 'that there is no **detailed assessment of the compliance of projects with international law'.**

- Specific concerns are raised regarding novel guns based on laser and electromagnetic systems, AI systems, electronic devices and cyber response, unmanned systems, combat drones and target location, tracking and designation systems. In particular, it is unclear how 'smart' weaponry might accurately distinguish between civilians or armed combatants in situations of war.

The EDF and its precursor programmes explicitly aim to strengthening the 'global competitiveness' of the technological industrial base of European defence. There is a major disconnect between such technologies and their potential impact beyond the profits they will generate. They will inevitably **boost European arms exports and fuel the global arms race, which will in turn lead to more armed conflicts and wars, greater destruction, significant loss of life, and increased forced displacement.** As we emerge from a global pandemic, the need to reimagine what we mean by security and ask what makes people feel safe has never been more evident. Is it investment in armament, defence infrastructure and the military? Or is it through guaranteeing access to a functioning public health system, education and improving access to social services, responding to climate breakdown, and other global challenges? In allocating billions of euros to defence projects, the EU has made a political choice to prioritise already highly lucrative arms companies rather than citizens' well-being. In doing so it is fuelling rather than stemming instability and the likelihood of conflict.

INTRODUCTION

In February 2022, the European Commission (EC) published a communication in which it warned that 'the European Union faces increased global instability and geopolitical friction' and that 'a quantum leap in European defence is an integral and indispensable part of securing the Union and its citizens in the years and decades to come'.[1] Its premise is that Europe must increase its 'preparedness, capabilities and resilience' and to do this it calls for greater cooperation and alignment with the highly lucrative, profit-driven, arms industry.

This communication is nothing new in itself, but further entrenches the EU's established shift from its origins as a peace project to becoming a global military player. The logic of European leaders appears to be that security is best achieved through funding weaponry, which in turn fuels an arms race, and lays the groundwork for war. In recent years, the EU has created unprecedented budget lines to fund the research and development (R&D) of highly controversial military wares, among other aspects of its growing trend towards militarism. This shift is indicative of where the EU's priorities lie and how it identifies as a political project. European institutions have failed to recognise that by bolstering military strength, they are in fact contributing to a growing sense of global instability, and rather than avoiding war, they could potentially provoke one. This report focuses on how the first EU budget lines for the creation of controversial military wares have shown highly problematic trends. It shows that decision-making at the highest European levels has been captured by the very arms industries that stand to reap massive financial returns from defence budgets that they are directly influential in creating. European public money is being used to fund the development of highly controversial armaments that rely on 'smart' technologies, despite the legal and ethical concerns regarding their deployment. Specifically, the report focuses on the eight largest beneficiaries of the precursor programmes to Europe's Defence Fund (EDF), revealing that all are involved in controversial arms exports, five have faced allegations of being involved in significant corruption, and some are involved in the development, production, or manufacture of nuclear weapons. The European Defence Fund (2021–2027) has a budget that is 1250% higher than its precursor programmes combined, meaning that the research findings signal the direction the EU is likely to take in the coming years.

The opening chapter discusses how the EU embarked on the road of unprecedented funding for military and defence projects, marking a new point of departure for the Union. This policy shift did not take place in a vacuum or with no explanation. Arms trade lobbyists, far from being independent experts who are called upon to implement European defence strategies, are themselves actively invested in directly influencing EU decision-making at the highest levels. There is a direct causal relationship between greater lobbying by advocates of the arms trade in Brussels and the subsequent allocation of funding to arms companies to research and develop military wares. Specifically, this report analyses the Preparatory Action for Defence Research (PADR, 2017–2019[2]) and the European Defence Industrial Development Programme (EDIDP, 2019–2020[3]), which jointly granted almost €600 million for defence research and development. Although not all the information on how this funding was allocated has yet been published, the research shows that the funding has been granted to lucrative arms companies, arms research institutes, and arms lobbyists to develop controversial military and defence materiel. These findings are stark, not only in and of themselves, but because they signal what lies ahead. These programmes were precursors of the European Defence Fund (EDF), with an unprecedented budget of €8 billion. The hypothesis is that this is merely the tip of the iceberg in terms of what is to come as Europe prepares to invest even more in militarism. By 2027, there are likely to be powerful alliances between some of the world's most lucrative and influential arms players.

Corruption is rife within the arms trade.[4] Chapter 2 shows that five of the arms companies – Leonardo, Safran, Thales, Airbus, and Saab – among the top eight beneficiaries of EU money have faced significant allegations of corruption in recent years. Despite these allegations being in the public domain, under the PADR and EDIDP budget lines the EU has to date allocated €89.92 million to these companies, although once the entire budget allocation has been published this is likely to be much higher. The EU claims to uphold the rule of law and the democratic process among its core values. However, in allocating funds to companies that have faced serious corruption allegations, been taken to court and, in some cases, been penalised as a result, the EU is falling short in its obligation to guarantee that no European public money is used to facilitate breaches of European and international law.

Chapter 3 details three case studies that exemplify how European defence funding is being used at the national level: France – a major arms producer and exporter; the Netherlands – a smaller country with a significant arms industry; and Ireland – a country with a history of neutrality and a strong tradition of peacebuilding, but which is showing signs of tilting towards Europe's militarised policies.

Chapter 4 is a technical analysis of the projects that have been approved thus far employing a methodology that focuses on key words that featured in the funding calls and in the published information about the approved projects. The projects are categorised as (1) disruptive defence and protection projects, (2) disruptive tools for defence, (3) non-disruptive tools for defence, and (4) disruptive combat systems projects. Regardless of the categorisation, we found that all funded projects have the potential to provoke or contribute to massive destruction, devastation, and loss of life. The EU, as an institute prides itself as a promoter of peace, yet through the development of this weaponry, it is fuelling a new type of arms race that is characterised by 'smart' military wares, with numerous arms companies competing for funds.

Chapter 5 discusses the ethical and legal implications in EU spending being allocated to controversial defence technologies. It explores the EU's obligations under International Humanitarian Law (IHL) specifically with regard to the development of new weapons and highlights how the EU is falling far short of fulfilling the most basic of standards. The checks in place in the EU application calls would appear to be more of a self-assessment – box-ticking exercise, rather than a rigorous effort to ensure that no European public money ends up funding the research and development of weaponry, whose use would contravene international law. There were serious gaps with regard to the information available and attempts by civil society to gather further details on the ethical checks were inadequately addressed, a cause for serious concern, according to the Ombudsman's Office. This chapter focuses, in particular, on 'smart' weaponry and what its development means for future wars. Of note the EU's AI Regulation, which is currently being developed, specifically exempts military equipment, meaning that such technology is, as yet, unregulated. The EU is ploughing ahead with the development of 'smart' weaponry, in the absence of legislation that might impede it from doing so in the future, without addressing the huge concerns surrounding the deployment of 'smart' weapons in war and armed conflict.

EUROPE MILITARISED

From corporate lobby to the European Defence Fund

By Mark Akkerman

The European Defence Fund (EDF) was designed to support the research and development (R&D) of new weapons systems and military technologies across the European Union (EU). It has an EU budget of €8 billion allocated under the current Multiannual Financial Framework (MFF), which will run from 2021 to 2027.

In addition, EU member states are expected to contribute many billions more in co-financing initiatives. Although the EDF is unprecedented and sets the EU on a path of military expansion, it was preceded by two pilot programmes of limited duration and budget known as the Preparatory Action for Defence Research (PADR, 2017–2019[5]) and the European Defence Industrial Development Programme (EDIDP, 2019–2020[6]).[7] This report examines the projects implemented under these two budget lines to give an idea of what can be expected under the EDF. By way of introduction, we first contextualise how the EU went from being a peace project to embarking on extensive militarisation.

The road to European defence spending

The establishment of the EDF, and its precursors PADR and EDIDP, are part of a broader EU aim to strengthen defence and internal cooperation, and to develop military capacity. This process formally began in November 2016 with a European Commission (EC) proposal that ultimately led to establishing the EDF. The proposal was presented as part of the European Defence Action Plan (EDAP),[8] launched by Jean-Claude Juncker, then President of the European Commission, who stated that 'if Europe does not take care of its own security, nobody else will do it for us. A strong, competitive and innovative defence industrial base is what will give us strategic autonomy'.[9] The presentation of the EDAP was not unexpected, since there had already been discussions between key political players and lobbyists for arms companies that focused on persuading the EU to allocate funding for military research. A report entitled 'Securing Profits', published by the Belgian-based non-government organisation (NGO) Vredesactie, traces the origins of these discussions to 2010, when the AeroSpace and Defence Industries Association of Europe (ASD), the most important lobby organisation for the European arms industry, called for significant EU funding for research.[10] In the following years, the view that the EU should allocate funding to defence initiatives became more institutionalised, culminating in the EC setting up the Group of Personalities on Defence Research (henceforth GoP) in 2015.[11] Of the 16 GoP members, six represented arms companies, namely **Airbus**, **BAE Systems**, **Indra**, **Leonardo**, **MBDA**, and **Saab**, two represented arms research institutes, **Fraunhofer** and **TNO**, and one represented the arms industry lobby organisation, **AeroSpace and Defence Industries Association of Europe** (ASD).[12] In other words, the GoP advising the EU on funding for defence research was predominantly made up of representatives of entities which stood to make massive profits directly from EU funding allocations. This presents a clear conflict of interest. Of note is the case of Fraunhofer – it was formally represented by its President, Reimund Neugebauer, but in practice much of the work in the Group was carried out by Klaus Thoma, a former director of one of the Fraunhofer Institutes and the former chair of the Fraunhofer Group for Defence and Security.[13] While participating in the GoP, the European Parliament also contracted Thoma as an independent expert to conduct a study on the need for an EU Defence Research Programme.[14] This study was later used as a major internal lobbying tool by pro-arms industry Members of the European Parliament (MEPs) to persuade their colleagues to approve the Preparatory Action on Defence Research (PADR).[15] The final GoP report, published in February 2016, formed the basis for the eventual EC proposal to establish the EDF. In other words, a report compiled largely by arms trade representatives in

effect became the proposal that the EC would use to advocate for and allocate funding that would ultimately be granted to those same arms trade companies. The report itself uses quite alarmist language, particularly with regard to the perceived state of the European military industry and how this supposedly threatens European security, concluding that billions of euros should be allocated for R&D, with a large role for the industry in implementing it.[16] The arms industry was hugely successful in lobbying for major funding through the EDF and its precursors. In addition, other requests made by the arms trade lobbyists were also granted, such as, contrary to common practice for EU-funded research, leaving the ownership of intellectual property rights solely with the research consortium participants instead of the principles of joint ownership (with the EU) and open access which normally apply, with some limitations, to EU funded research.[17] A Commission document dated June 2017, with the launch of the EDF, states that the industry will form part of the coordination of the fund 'as appropriate'.[18] For research-specific funding, including PADR, the Commission assured industry stakeholders that they would be involved in the preparation and implementation of the programme.

It is common practice to establish formal advisory groups to advise the Commission on budget implementation, made up of private or public stakeholders. These groups are listed in a public register, which provides details of the group members and basic information on meetings held. Thus far however, no such advisory group has been established to monitor the implementation of PARD and EDIDP funding. In the absence of a formal advisory group, correspondence between the EC and budget beneficiaries remains largely informal. This makes the watchdog role played by civil society groups much more cumbersome. They are forced to submit freedom of information requests, which are lengthy and time-consuming procedures that rarely lead to an adequate disclosure information. This sets a dangerous precedent with regard at transparency and democratic oversight of the EU's first military budget line.

EU institutions also welcomed the input from the arms industry in other ways. The ASD Secretary-General, Jan Pie, briefed the European Parliament's Committee on Industry, Research and Energy in January 2018 on the EDIDP proposal, stressing that '[t]he industry is confident that a structured dialogue with the European Institutions will ensure the successful implementation of this important initiative'.[19] In 2019, at a high-level conference on the EDF organised by the Council of the EU, then ASD president Trappier was invited as a keynote speaker. He thanked the European Commission because, for the first time, 'EU money has been mobilised, to support the defence sector'.[20] The process leading to the establishment of the EDF and its precursors resembles the earlier military and security industry lobbying for funding for security-related research. While military research had been excluded from EU funding before 2017, the military and security industry found their niche in the 'security' aspect of the seven-year Framework Programmes (the EU programmes for funding research), with annual funding of hundreds of millions of euros. The security research programme was set up on the advice of another 'Group of Personalities' which was also dominated by arms industry representatives.[21]

Indeed, in a report on the allocation of funding for security research, Statewatch and the Transnational Institute found that many of the same companies and research institutes that were among the largest beneficiaries of PADR and EDIDP funding, (Airbus, Fraunhofer, Leonardo, Thales and TNO) were also in the top 15 recipients of security research funding until December 2016, just before the start of PADR.[22]

Campaigning against military-driven research and innovation funding

During the political discussions regarding the EDF, the European Network Against Arms Trade (ENAAT) and its member organisations actively campaigned against it at the national and European level.[23] The objections ENAAT raised against EU defence spending are as relevant today as they were in 2016, when the campaign got underway, namely that:

- it contributes to a worrying shift of the EU mission from a civilian peace project to a military-led one;

- the decision-making process is too heavily influenced by the arms industry lobbyists and is neither transparent nor democratic;

- the European Parliament and the Council are asked to vote for a blank cheque;

- it could set unprecedented grants conditions for the arms industry which does not respect the right of public interest;

- it diverts part of the EU budget from other priorities which are much more relevant for people's well-being, such as health care, education, and other social questions;

- EU member states are not ready or willing to serve the common interest in defence matters;

- it will not contribute to more security, but rather represents the wasting of public money on boosting industry profits while doing nothing to make society safer in terms of human security.[24]

ENAAT also warned that the funding could fuel the global arms race and contribute to the development of controversial arms and technologies.[25] While the R&D of autonomous lethal weapons with no meaningful human control (such as 'killer robots') is not (yet) permitted under EDF funding criteria, other automated weapons, autonomous systems and controversial technologies are. The European Commission, for example, foresees an important role for the development of Artificial Intelligence (AI)-related technologies in military research.[26]

Finally, ENAAT noted that the EDF and its predecessors signal 'a shift towards technological and military "answers" to political and societal challenges – profiting the industry, not citizens'.[27] This is part of a broader trend to frame questions, such as migration, climate change and the COVID-19 pandemic, as security problems that therefore require a securitised solution. This narrative, which is driven by military and security industry lobbyists, eventually leads to militarisation. Apart from the direct consequence of deploying ever more arms to militarise society, money that could and should be used to bring about real, durable political and social solutions to important issues of our time is instead being allocated to the defence industry.

The funding programmes explained:

The Preparatory Action for Defence Research (PADR) and the European Defence Industrial Development Programme (EDIDP) as precursors to the European Defence Fund (EDF)[28]

BUDGET LINE 1

Preparatory Action for Defence Research (PADR)

YEARS: 2017–2019   **TOTAL BUDGET:** €90 million   **NUMBER OF PROJECTS:** 18

MANAGED BY: European Defence Agency (EDA)

OBJECTIVE: 'The Preparatory Action on Defence Research is a concrete step aimed at assessing and demonstrating the added-value of EU supported defence research and technology (R&T). The relevant results are expected to further deepen European defence cooperation, addressing capability shortfalls, and to strengthen European defence stakeholders.'[29]

BUDGET LINE 2

European Defence Industrial Development Programme (EDIDP)

YEARS: 2019–2020   **TOTAL BUDGET:** €500 million   **NUMBER OF PROJECTS:** 44

Of the 44 projects, two were directly awarded following selection by the Commission, separate to the tender procedure.

MANAGED BY: European Commission (DG Defence Industry and Space), with the exception of the two directly awarded projects, which are managed by the Organisation Conjointe de Coopération en matière d'Armement (OCCAR – Organisation for Joint Armament Cooperation).[30]

OBJECTIVES:

- 'to foster competitiveness, efficiency and innovation capacity of the defence industry, and to contribute to the Union's strategic autonomy;

- to support and leverage the cooperation, including across borders. This cooperation shall be in line with defence capability priorities agreed by MSs [Member States];

- to foster better exploitation of the results of defence research supporting the competitiveness of the European defence industry.'[31]

Regarding the breakdown of projects funded under these two budget lines:

Of the **18 projects** funded under PADR, there is no published data regarding the participants for five of them.

→

Of the **44 projects** funded under the EDIDP 2020 Call (awarded in 2021), no data regarding the participants has been published for 26 of these projects, or on the two directly awarded projects.

The remaining **29 projects,** on which information has been published, represent **€280.92 million,** or **48.7%** of the total funding.

This report focuses on these **29 projects;** exact figures refer to the part of the funding for which we have obtained all the available information on the breakdown of participants.[32][33] These figures are likely to change once all the information is published.

The EDF has two 'windows': research (€2.7 billion) and capability development (€5.3 billion).[34] Its precursors had a similar focus, with PADR focused on research and EDIDP on capability development, which is the phase following research where actual products or technologies are developed (or existing ones are upgraded) (see Table 1).

Of particular concern is the question of co-funding from EU member states. 'Member States, as end-users of defence equipment, have a central role in the implementation of the PADR, the EDIDP and the future EDF. EDIDP and EDF development projects are linked to Member States equipment/armament programmes. Furthermore, important co-funding from Member States is required as well as the intention of Member States to commonly acquire the developed product or technology.'[35] In a nutshell, the EU is actively encouraging member states, through its defence funding initiatives, to arm themselves and increase their military strength.

The EU's call for member states both to fund research and subsequently purchase the final product responds to a frequent complaint from the arms industry about the gap between funding for R&D and the purchase of the final product. In other words, these funding lines not only promote the R&D phases of the defence industry, but actively call for EU countries to then purchase the arms and related technologies.

For funding under the EDF capability budget, it is foreseen that various groups of member states co-finance projects that are linked to their own equipment and arms programmes. In the context of coherence with other EU military initiatives, funding for projects connected to PESCO (Permanent Structured Cooperation – a framework to deepen cooperation on defence and capability development between member states) is also given priority. Of the 44 projects funded under EDIDP, 24 appear to overlap with PESCO.[36]

According to a study presented to the European Parliament, PADR and EDIDP funding applicants are generally positive about the programmes. In addition to potentially receiving funds, the requirement for consortia-led applications enables applicants to expand their professional networks at the European level. The study notes, however, that 'the very short deadlines of the calls for projects have made it quasi-impossible for new entrants to the defence market to participate in consortia in the absence of previous partnerships with one or several participants to the consortia'. This means that the funding favours already established companies with good networks that already dominate and control the market and thus serve primarily as a subsidy instrument for large arms companies.[37] While all forms of arms production is problematic, it is particularly disturbing that so much European public money is being used to prop up, maintain and subsidise the biggest arms dealers in one of the most profitably industries in the world.

While discussing the application criteria for PADR, EDIDP and EDF funding, EU member states with no major arms companies created provisions to include small and medium enterprises (SMEs). The ASD was less favourable to this idea, stating that large companies "often have essential specialist defence skills, facilities and capabilities that most SMEs simply cannot sustain' and thus are better suited to attain the objective of being more competitive.[38] The message from arms trade lobbyists is clear – the EU and its member states should prioritise large arms companies. It would appear that the motives are more to do with markets, domination and profitability than providing the wherewithal for security or making people safe.

The PADR- and EDIDP-funded projects explained

The projects funded under PADR and EDIDP are based on calls, determined by the European Commission in the annual working programmes, which set priorities for military cooperation and capability development. One call may encompass several projects. For example, calls for PADR and EDIDP have included making funding available for unmanned systems, disruptive technologies, surveillance, air and ground combat capabilities, navigation, cybersecurity, underwater control, AI and situational awareness.

With the exception of the Ocean Cooperation for European Maritime Awareness[39] (OCEAN2020) consortium, which obtained about 40% of the total PADR budget, all the projects with the largest EU contributions are funded under EDIDP, as shown in Table 1. The Italian arms company Leonardo coordinates three of the ten largest projects.[40]

Table 1: Top ten EU-funded projects under PADR and EDIDP

Projects with largest EU contributions – PADR and EDIDP[41]			
	Name		**EU contribution**	**Project coordinator**
1	MALE RPAS	EDIDP	€ 98,115,022.00	Airbus
	Development of European Medium-Altitude Long-Endurance Remotely Piloted Air System			
2	GEODE	EDIDP	€ 43,974,166.81	FDC
	Galileo for EU Defence[42]			
3	OCEAN2020	PADR	€ 35,480,000.00	Leonardo
	Open Cooperation for European maritime awareness			
4	ESSOR	EDIDP	€ 34,655,931.00	Leonardo
	Interoperable communication activities for waveforms at tactical level compliant with European Secure SOftware defined Radio (ESSOR) and Software Communication Architecture (SCA) software defined radio platforms			
5	iMUGS	EDIDP	€ 30,600,000.00	Milrem
	Integrated Modular Unmanned Ground System			
6	EUDAAS	EDIDP	€ 21,197,536.28	Saab
	European Detect and Avoid (DAA) function based on new sensors and processing for RPAS integration into air-traffic management			
7	ESC2	EDIDP	€ 20,000,000.00	Indra
	European Command and Control (C2) system from strategic to tactical level			
8	SEA Defence	EDIDP	€ 14,290,676.32	Damen
	Survivability, Electrification, Automation, Detectability, Enabling Foresight of European Naval Capabilities in Extreme Conditions			
9	JEY-CUAS	EDIDP	€ 13,000,000.00	Leonardo
	Joint European system for Countering Unmanned Aerial Systems			
10	USSPS	EDIDP	€ 12,796,545.80	ETME
	Development of Unmanned Semi-fixed Sea Platforms for Maritime Surveillance			

The EDIDP regulations allow it to award funding directly to a consortium if there are no other competitive consortia for major capability development projects of 'high strategic importance'. According to the EC this is the case for the MALE RPAS (development of a European drone) and ESSOR (development of an interoperable, secure defence communications system) projects.[43]

Companies

The funding for the 62 projects under PADR and EDIDP was allocated to 428 companies, research institutes and public institutions. To be eligible, a consortium has to comprise at least three entities from three EU member states.[44] While there are projects with only three participants, such as ALTISS (Autonomous Light Intelligence & Surveillance System), others have many more, such as JEY-CUAS (Joint European System for Countering Unmanned Aerial Systems), with 38 participants from 14 member states, and OCEAN 2020, which has 42 participants from 15 member states.[45]

As Table 2 shows, the Italian company Leonardo, the largest arms company in the EU, has received the greatest volume of PADR and EDIDP funding. Other companies in the top 10 include large military companies such as Indra, Safran, Thales and Saab.

Table 2. Top 10 recipients of PADR and EDIDP funding

Single entities with largest shares of PADR and EDIDP funding			
	Name	Country	Funding (mln €)
1	Leonardo	Italy	23.59
2	Indra	Spain	22.78
3	Safran	France	22.33
4	Thales SIX	France	8.76
5	Saab	Sweden	8.16
6	Hensoldt	Germany	8.12
7	Fraunhofer	Germany	8.07
8	Milrem	Estonia	5.92
9	GMV	Spain	5.37
10	Diehl	Germany	5.32

In order to have a clear picture of which companies actually receive the funding we need to look deeper. Many large arms companies include a range of companies, subsidiaries and joint ventures in various countries (see Table 3). Taking this into account and adding up the total funding received through various entities (partly) belonging to the same company, the overall picture shifts even more towards the large arms companies. In particular Leonardo, Thales and Airbus receive more funding than might appear at first sight.

Table 3 Total funding for main and subsidiary companies receiving EU defence funding

	Largest beneficiaries of PADR and EDIDP funding[46]		
	Name	**Country (headquarters)**	**Funding (mln €)**
1	*Leonardo*	Italy	28.71
2	*Indra*	Spain	22.78
3	Safran	France	22.33
4	Thales	France	18.64
5	*Airbus*	France, Germany, Spain[47]	10.17
6	*Saab*	Sweden	10.07
7	Hensoldt	Germany	8.12
8	*Fraunhofer*	Germany	8.07
9	KMW+Nexter Defense Systems	France, Germany[48]	6.90
10	GMV	Spain	6.24
11	Intracom	Greece	6.10
12	Milrem	Estonia	5.92
13	Diehl	Germany	5.32
14	*TNO*	Netherlands	4.66
15	Bittium	Finland	3.26
	Companies in italics were part of the Group of Personalities		

All the companies participating in the GoP combined received over €86 million, or 30.7% of the allocated funds, and the 15 largest beneficiaries got over 59% of the funding. So, while the European Commission has claimed that 'EDIDP is a programme for all Member States and for companies of all size', with 'specific provisions to incentivise the participation of Small and Medium-sized Enterprises (SMEs) and mid-caps throughout the Union', in reality most of the funding goes to the large arms companies, including those that have lobbied the hardest for the establishment of funding instruments for military research and innovation.[49]

As explained above, this information refers to 29 of the 62 projects that received funding, or just under half of the total awarded under PADR and EDIDP. The projects for which no breakdown of the funding to participating entities is available show that many of the companies in the top 15 are also involved in these projects. This includes the MALE RPAS project, which has received by far the greatest amount (€98.1, million, or 17% of the total). The consortium for this project includes Airbus, Leonardo and Dassault Aviation.[50] The other project that was directly awarded, ESSOR (the fourth largest overall with €34.7 million funding) is coordinated by Leonardo, and also includes Indra, Thales and Bittium.[51]

A deeper look at the eight largest beneficiaries of the funding shows that most are involved in highly controversial arms deals, including exports to countries engaged in war and armed conflict, governed by authoritarian regimes, where human rights abuses are rife, are involved in the development, production or maintenance of nuclear weapons, or are frequently alleged to be corrupt.[52] With the exception of the research institute Fraunhofer, all of the biggest players mentioned are among the world's 100 largest arms-producing companies.[53] Their combined sales in military business in 2020 were over $42 billion, underscoring the analysis of Vredesactie at the start of PADR that 'the fund is an industrial stimulus fund for the major European arms-multinationals, located in only a few European countries'.[54]

Profiles of eight largest beneficiaries PADR and EDIDP funding[55]

1 LEONARDO

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 13[56]	**HEADQUARTERS: Rome, Italy**
DEFENCE REVENUE (2020): US$11.173 billion[57]	**CEO: Alessandro Profumo**
TOTAL REVENUE (2020): €13.410 billion[58]	**BRUSSELS LOBBY BUDGET (2020): €300,000 – €399,000[60]**
NUMBER OF EMPLOYEES (2020): 49,882[59]	**NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 47[61]**

PROFILE: Leonardo, formerly known as Finmeccanica, is the largest arms-producing company in the EU. The Italian state owns 30.2% of its shares. Its CEO, Alessandro Profumo, is also currently president of ASD. Leonardo has a broad military portfolio, including helicopters, aircraft, artillery, armoured vehicles, underwater systems, cybersecurity and defence electronics. The company owns 37.5% of the missile manufacturer, MBDA.

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021): Bahrain, Cameroon, Colombia, Egypt, India, Israel, Nigeria, Pakistan, Philippines, Saudi Arabia, Turkey, Turkmenistan, UAE, Venezuela[62]

2 Indra (Indra Sistemas)

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 100[63]	**HEADQUARTERS: Madrid, Spain**
DEFENCE REVENUE (2020): US$0.594 billion[64]	**CEO: Cristina Ruiz, Ignacio Mataix**
TOTAL REVENUE (2020): €3,043 billion[65]	**BRUSSELS LOBBY BUDGET (2020): €900,000–€999,999[67]**
NUMBER OF EMPLOYEES (2020): 48,659[66]	**NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 17[68]**

PROFILE: Indra, an IT and consultancy company, produces military and communications software, radar and IT systems, for example for air surveillance, electronic combat and cyber-defence. The Spanish state owns 18.7% of Indra.

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021): Azerbaijan, Colombia, India, Turkey[69]

3 SAFRAN

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 26[70]	**HEADQUARTERS: Paris, France**
DEFENCE REVENUE (2020): US$4.707 billion[71]	**CEO: Olivier Andriès**
TOTAL REVENUE (2020): €16,498 billion[72]	**BRUSSELS LOBBY BUDGET (2020): €300,000–€399,999[74]**
NUMBER OF EMPLOYEES (2020): 78,892[73]	**NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 15[75]**

PROFILE: Safran, a result of the merger of Snecma and Sagem in 2005, produces engines for aircraft and missiles, landing gear, optronics, drones, avionics and electronic systems for the military market. The French state owns 11.2% of Safran.

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021): Egypt, India, Turkey[76]

THALES

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 16[77]

DEFENCE REVENUE (2020): US$9.228 billion[78]

TOTAL REVENUE (2020): €16,989 billion[79]

NUMBER OF EMPLOYEES (2020): 80,500[80]

HEADQUARTERS: Paris, France

CEO: Patrice Caine

BRUSSELS LOBBY BUDGET (2020): €300,000–€399,999[81]

NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 28[82]

PROFILE: Thales is the third largest arms-producing company in the EU. It produces a wide range of arms and military technology, including radar, drones, weapons systems, rifles, command, control and communication systems, armoured vehicles and tactical radios. The French state owns 25.7% of Thales.

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021):
Egypt, India, Philippines, Saudi Arabia, Turkey, Turkmenistan, UAE[83]

AIRBUS

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 12[84]

DEFENCE REVENUE (2020): US$12.004 billion[85]

TOTAL REVENUE (2020): €49,912 billion[86]

NUMBER OF EMPLOYEES (2020): 131,349[87]

HEADQUARTERS: Leiden, the Netherlands (official); Blagnac, France (corporate)

CEO: Guillaume Faury

BRUSSELS LOBBY BUDGET (2020): €1,250,000–€1,499,999[88]

NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 222[89]

PROFILE: Airbus, formerly known as EADS (European Aeronautic Defence and Space Company), is the result of a merger of several French, German and Spanish aerospace companies. Airbus is partially owned by the states of France (10.9%), Germany (10.9%) and Spain (4.11%). The company produces a wide range of arms and military technologies, including helicopters, drones, avionics, electronic military systems, radars, sensors and satellites. Airbus owns 37.5% of the missile manufacturer MBDA.

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021): China, Egypt, India, Libya, Mali, Philippines, Saudi Arabia, Turkey, Turkmenistan, UAE[90]

SAAB

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 36[91]

DEFENCE REVENUE (2020): US$3,385 billion[92]

TOTAL REVENUE (2020): SEK 35, 431 billion (about €3.85 billion)[93]

NUMBER OF EMPLOYEES (2020): 17,822[94]

HEADQUARTERS: Stockholm, Sweden

CEO: Micael Johansson

Brussels lobby budget (2018): €200,000–€299,999[95]

NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 16[96]

PROFILE: Saab is Sweden's largest arms company. It produces aircraft, drones, vessels, missiles and naval communications, combat management and radar systems.

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021):
India, Pakistan, Philippines, UAE[97]

7 ▸ HENSOLDT

RANKING AMONG TOP 100 ARMS-PRODUCING COMPANIES (2020): 64[98]

DEFENCE REVENUE (2020): $1,378 billion[99]

TOTAL REVENUE: €1,207 billion[100]

NUMBER OF EMPLOYEES (2020): 5,227[101]

PROFILE: Hensoldt is a German military company. It was originally active in the electronics and border security business units of Airbus, which were sold in early 2017 to the US private equity firm KKR & Co for about €1.1 billion.[104] **The German state owns 25.1% of the company. Hensoldt produces radar systems, optronics and avionics for the military market.**

HEADQUARTERS: Taufkirchen, Germany

CEO: Thomas Müller

BRUSSELS LOBBY BUDGET (2020): €500,000–€599,999[102]

NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 3[103]

CONTROVERSIAL ARMS-EXPORT DESTINATIONS (2016–2021): India, Philippines, Turkey[105]

8 ▸ Fraunhofer

TOTAL REVENUE (2020): €2,823 billion[106]

NUMBER OF EMPLOYEES (2020): 29,069[107]

HEADQUARTERS: Munich, Germany

PRESIDENT: Reimund Neugebauer

BRUSSELS LOBBY BUDGET (2019): €400,000–€499,999[108]

NUMBER OF MEETINGS WITH EUROPEAN COMMISSION: 24[109]

PROFILE: The German research organisation Fraunhofer is not an arms company, but has a broad R&D portfolio, with a 'focus on developing key technologies that are vital for the future and enabling the commercial exploitation of this work by business and industry'.[110]

CASE STUDY ONE: YEMEN WAR

Since the war in Yemen began in 2015 much of the debate regarding EU arms exports has centred on that country. Peace activists and human rights groups have called for an EU arms embargo on Saudi Arabia, which has led the military intervention in Yemen, and other involved parties, such as the UAE and Egypt. The European Parliament has also called for an arms embargo on several occasions, but decisions about such matters can only be taken by the member states in the Council and not at parliamentary level. After the enforced disappearance and murder of the Saudi journalist, Jamal Kashoggi, in October 2018, inside the Saudi embassy in Turkey, several member states finally placed restrictions on arms exports to Saudi Arabia, including Germany, Italy and Sweden.[111]

Even so, most of the companies profiled above have supplied arms to one or more of the warring parties, which have been deployed in the war, such as Eurofighter Typhoon fighter jets manufactured by a consortium including Airbus and Leonardo. These planes are equipped with missiles from MBDA, which is co-owned by the same companies, and targeting devices supplied by Thales.[112] The continuing war did not prevent a deal between Saab and the UAE for the delivery of two Erieye Airborne Early Warning and Control systems, or a new cooperation agreement between Hensoldt and Saudi Arabia's Intra Defence Technologies for the development of airborne surveillance and targeting systems.[113]

Yemen is not the only country of concern in the region. Turkey, with its authoritarian and repressive government, attacks on the Kurdish population, tensions with neighbouring countries and involvement in the wars in Yemen and Libya, is also a client for most of the companies.[114]

The examples of Yemen and Turkey, where European manufactured weapons have continued to pour in to these volatile environments in recent years serve as a reminder that military equipment funded by the EU does not bring about stability or safety, it only further fuels war, destruction and displacement, and props up authoritarian regimes.

CASE STUDY TWO: NUCLEAR WEAPONS

Many of the arms companies in receipt of European funding are also involved in the production of nuclear weapons. While Europe may not be directly funding the creation of a nuclear arsenal, it is most definitely funding companies trading in nuclear armament.

Biological and chemical weapons have long been outlawed and the entry into force of the Treaty on the Prohibition of Nuclear Weapons in January 2021 added nuclear weapons to this list of banned weapons. In reality though, none of the nuclear states, including NATO members, is yet a signatory, of the nuclear treaty rendering the ban ineffective until they are.[115] Nevertheless, corporate involvement in working on nuclear weapons is increasingly unacceptable, and a growing number of (major) financial institutions has excluded or restricted investments in nuclear weapons companies.[116] Nonetheless, four of the eight largest beneficiaries of PADR and EDIDP funding – Airbus, Leonardo, Safran and Thales – are involved in the development, production and/or maintenance of nuclear weapons. For instance, all are directly, or via subsidiaries or joint ventures, working on the maintenance and/or renewal of French nuclear weapons.[117] Like other nuclear powers, France is modernising its nuclear arsenal, the core of which is the development and commissioning of new types of weapons, which, for example, due to a smaller explosive charge or a more precise operating system, are seen as having a more practical use in warfare.[118] This feeds the illusion that a more reduced, lower-intensity type of nuclear warfare could be envisaged and could or should be explored as a way to incorporate nuclear weapons into conventional war. This significantly lowers the threshold for their deployment and flies in the face of the 2021 Treaty.

The involvement of many of the largest beneficiaries of the PADR and EDIDP funding in arms exports to controversial destinations and in work related to nuclear weapons should raise questions about who and what the EU is actually financing, especially since one of the main objectives of these funds, and of the EDF, is to strengthen the competitiveness of the EU arms industry and hence to stimulate arms exports.
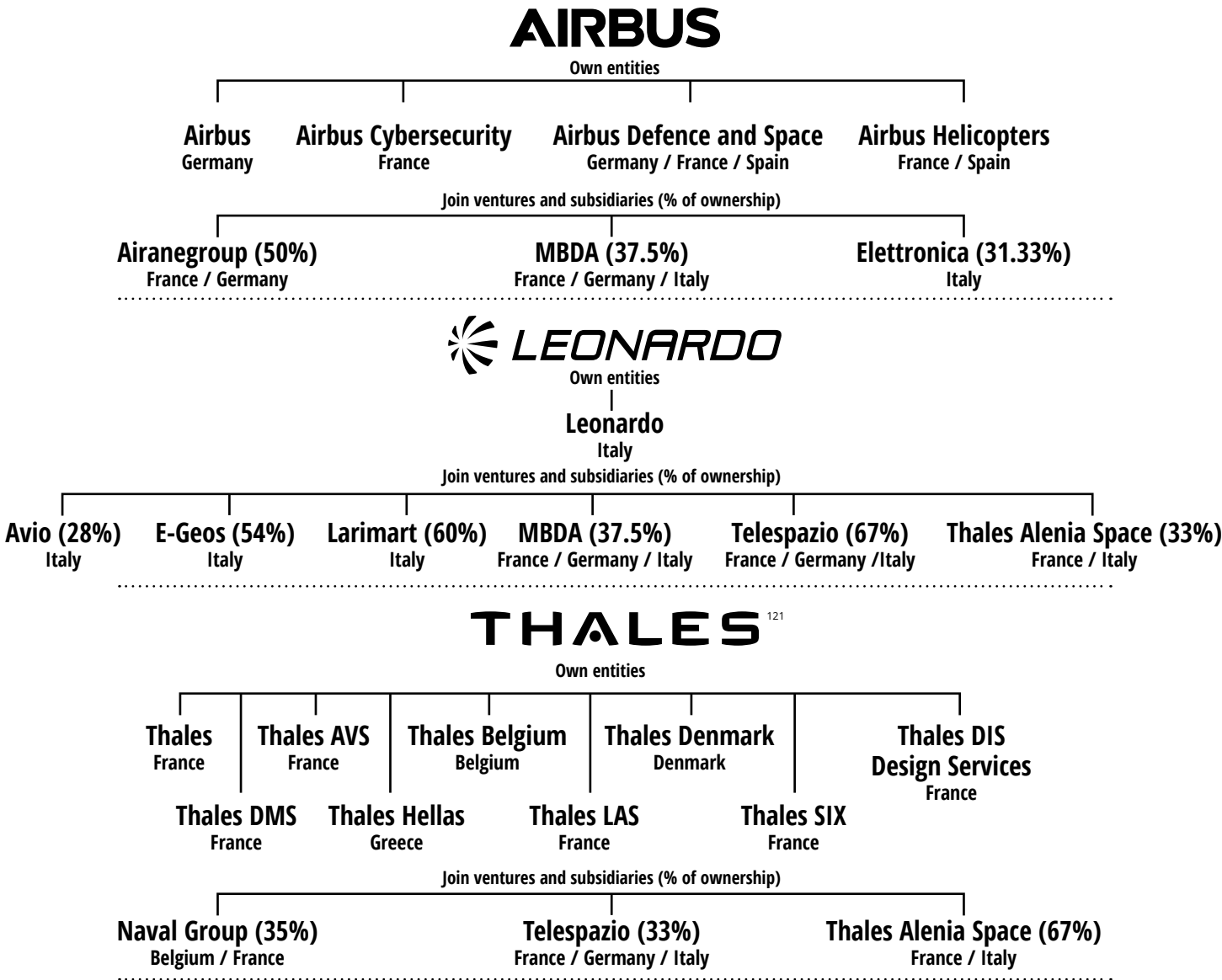
Joint ventures and subsidiaries

According to the Stockholm International Peace Research Institute (SIPRI), 'arms companies have a presence that reaches far beyond the countries in which they are headquartered'. Large arms companies often have a complex network of companies, subsidiaries and joint ventures, located in many countries, making it increasingly difficult to monitor their actions. SIPRI found that Europe hosts the highest number of single entities that make up the world's 15 largest arms companies and that 'this largely derives from the consolidation of the arms industry in Europe in the late 1990s and early 2000s. Although this led to a reduction in the number of major European arms companies overall, it often meant that the resulting companies had a higher number of entities in other countries than they did before the process of consolidation'.

SIPRI's observations are especially true for the three largest EU arms companies Leonardo, Airbus and Thales. SIPRI found that Leonardo has 59 foreign entities in 21 countries, including Italy and eight other European countries. Airbus has 41 foreign entities in 24 countries, including Germany, France and Spain, and seven other European nations. Thales tops the list with 67 foreign entities in 24 countries, including France and 11 other European countries.[119] These three arms giants also co-own other companies and have started joint ventures. MBDA, which is a large arms company in its own right, for example, is jointly owned by Airbus (37.5%), Leonardo (37.5%) and British BAE Systems (25%).[120]

The list of companies funded under PADR and EDIDP contains not only many entities of Airbus, Leonardo and Thales in various countries, but also several subsidiaries and joint ventures. Table 4 provides an overview based on a threshold of at least 25% ownership. This reflects the findings of SIPRI and shows that the major arms companies have a much bigger share of EU funding than is initially apparent.

Table 4: Major European arms-producing companies, joint ventures and subsidiaries
Participations in EU funded projects

AIRBUS
Own entities

Airbus	**Airbus Cybersecurity**	**Airbus Defence and Space**	**Airbus Helicopters**
Germany	France	Germany / France / Spain	France / Spain

Join ventures and subsidiaries (% of ownership)

Airanegroup (50%)	**MBDA (37.5%)**	**Elettronica (31.33%)**
France / Germany	France / Germany / Italy	Italy

LEONARDO
Own entities

Leonardo
Italy

Join ventures and subsidiaries (% of ownership)

Avio (28%)	**E-Geos (54%)**	**Larimart (60%)**	**MBDA (37.5%)**	**Telespazio (67%)**	**Thales Alenia Space (33%)**
Italy	Italy	Italy	France / Germany / Italy	France / Germany /Italy	France / Italy

THALES [121]
Own entities

Thales	**Thales AVS**	**Thales Belgium**	**Thales Denmark**	**Thales DIS Design Services**
France	France	Belgium	Denmark	France

Thales DMS	**Thales Hellas**	**Thales LAS**	**Thales SIX**
France	Greece	France	France

Join ventures and subsidiaries (% of ownership)

Naval Group (35%)	**Telespazio (33%)**	**Thales Alenia Space (67%)**
Belgium / France	France / Germany / Italy	France / Italy

Mergers and acquisitions, and companies buying stakes in other companies, happen frequently. In 2021, for example, Leonardo announced it will buy a 25.1% stake in Hensoldt.[122]

Possible impact on arms exports

Like the EDF, its predecessors PADR and EDIDP are promoted as a means to build the EU's strategic autonomy. In other words, an EU that is a powerful military force in its own right, that is less dependent on the US military and with a greater role in NATO.[123] Thierry Breton, European Commissioner for the defence industry, said: 'A more integrated, innovative and competitive European defence technological and industrial base is essential for a stronger, more resilient and strategically autonomous Europe'.[124]

This view has very worrying and far-reaching consequences for the EU's policy on arms exports. 'Without exporting arms there will not be a European defence industry', said the French MEP Nathalie Loiseau, who chaired the Subcommittee on Security and Defence of the European Parliament in 2019.[125] This echoes the advisory report on EU funding for military research of the 'Group of Personalities' on defence research set up by the European Commission. The GoP stated that 'domestic demand coupled with export success is essential in order for Europe to retain viable and globally competitive defence industrial players' and 'from an industrial viewpoint, access to international markets is a necessity, but not only as a means to compensate for a declining domestic market: export growth significantly contributes to sustaining the critical mass of European defence companies and highlights the competitiveness, capability, performance and reliability of European export products'. In this context 'new cooperative programmes at the European level would [...] generate new export opportunities, providing both access to and leverage in international markets'.[126]

Like much of the GoP's input, the EU adopted this view in establishing the EDF. In the European Defence Action Plan of November 2016 the EC, which announced plans to launch the EDF, said that the European military industry needs support 'to retain key skills and acquire new ones to be able to deliver high-tech defence products and services to meet security needs and compete in a global market long into the future'.[127] In the regulation establishing the EDIDP one of the listed objectives is 'supporting the competitiveness of the European defence industry on the internal market and the global marketplace'.[128]

In line with this, the Commission proposal for the EDF regulation stipulated that it 'is intended as an instrument to foster the competitiveness and innovativeness of the European defence technological and industrial base thereby contributing to the EU's strategic autonomy'[129], while Article 3 of the regulation states that 'the general objective of the Fund is to foster the competitiveness, efficiency and innovation capacity of the European defence industry [...]'.[130]

According to the EU, strategic autonomy depends on having a strong European military industrial base, but since this cannot depend solely on the European market, it needs to engage in arms exports. This logic inevitably leads to promoting and supporting arms exports, alongside direct funding for R&D of new arms and technologies under PADR, EDIDP and the EDF. With arms exports being supported at the top, and EU policies designed to further expand and bolster the arms trade markets and profit, it would be foolish to expect the same leaders to make any meaningful moves towards curbing or restricting regulations on arms exports. The current system actively promotes arms exports, irrespective of how problematic these may be. European political leaders know this but to date have done nothing to shift course, quite the reverse. Regardless of the devastating impact that arms exports have on societies in arms-importing countries, the EU is determined to advance its militarised agenda at all costs.

It is too early to tell which arms exports will eventually result from PADR and EDIDP funding. Many are still in the initial R&D phase and it will take time before any products are finalised. However, it is clear that the element of EU industrial competitiveness and increasing arms exports is central. The launch of the GEODE project, for example, was accompanied by a press release by the project coordinator FDC (France), which stated that 'GEODE will boost the EU industry competitiveness in the highly strategic domain of military positioning, timing and synchronisation' noting that the 'project will [...] create business opportunities for the EU industry in the field of military application of satellite navigation'.[131] Based on its participation in several EDIDP projects, Indra proudly presented itself as 'a driving force in the Spanish technological defence sector, strengthening its competitiveness on a global level in the defence market'.[132] Likewise, Taavi Veskimägi, Chair of the Council of the Defence Industry Association (EDIA) in Estonia, said the participation of Estonian companies in EDIDP projects provides opportunities for more arms exports.[133] Essentially, the funding is seen in terms of the lucrative profits the arms industry might make, and not the loss of life and devastation that will be the consequence of deploying these EU-funded weapons systems.

Since it is the large EU arms companies that most benefit from the research funding, and have already for some years been world leaders in exports, it is hard to see why they would need more support for exports, particularly at a time when European funding in areas such as health and education would likely contribute volumes towards bringing about actual human security and not the notion of militarised security as envisaged by the arms companies.

Countries

A study for the European Parliament noted that Europe's military industry 'is concentrated in a few countries and structured around national supply chains generally led by large companies'.[134] This is mirrored in the list of main beneficiaries of the funding under PADR and EDIDP, which includes mainly large arms companies such as Airbus, Leonardo, Saab, Safran and Thales.

The division of the funding among EU member states follows the same concentration. Of the money granted, 68.4% goes to Germany, France, Italy and Spain – also the nations where the large companies are headquartered with the largest volume of arms exports. Companies from these four countries coordinate 42 of the 62 projects (67.7%). Almost half of the EU members each receive less than 1% of the funding, namely Austria, Bulgaria, Czech Republic, Denmark, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Romania, Slovakia and Slovenia (see Table 5).

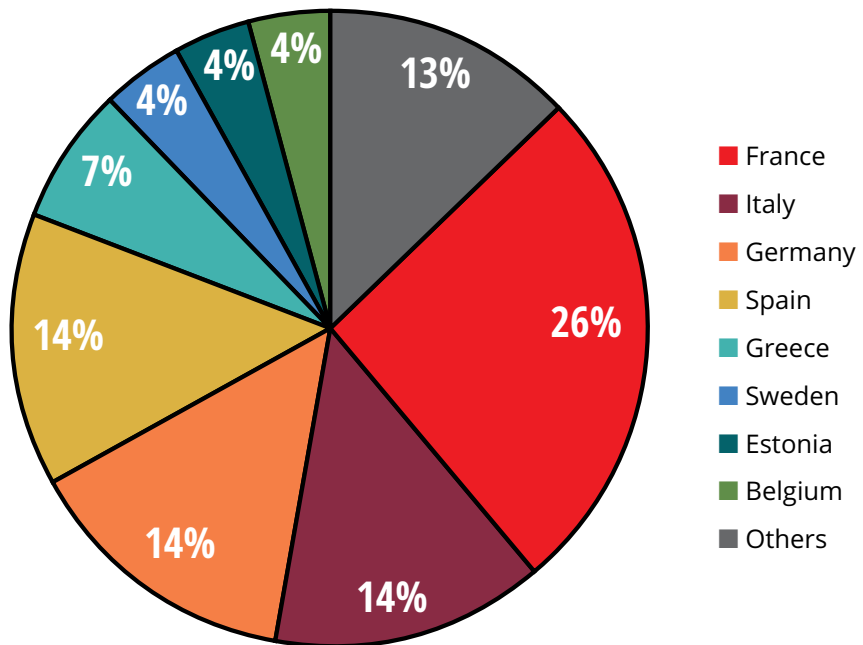**Table 5: Division of projects funded across EU member states**

	Country	Participations	Coordinated projects	Allocated funding (€ mln)
	Allocation of PADR and EDIDP funding to member states[135]			
1	France	149	16	74.27
2	Italy	95	11	40.36
3	Germany	72	5	39.35
4	Spain	88	10	38.54
5	Greece	39	5	18.79
6	Sweden	13	3	12.32
7	Estonia	14	1	10.30
8	Belgium	34	2	9.74
9	Netherlands	23	1	7.29
10	Finland	19	1	5.21
11	Portugal	24	1	3.45
12	Cyprus	14	0	3.37
13	Poland	21	0	3.35
14	Denmark	20	1	2.19
15	UK	7	0	2.02
16	Lithuania	14	1	1.88
17	Bulgaria	13	1	0.91
18	Hungary	4	0	0.86
19	Austria	13	1	0.81
20	Ireland	2	0	0.73
21	Luxembourg	1	0	0.72
22	Slovenia	7	1	0.65
23	Czech Rep	7	0	0.57
24	Norway	1	0	0.57
25	Romania	11	0	0.45
26	Latvia	7	1	0.35
27	Slovakia	1	0	0.19
28	Croatia	3	0	0.00

In this chapter we discussed how, through the granting of unprecedented amounts of money to defence spending, Europe is making a very distinct shift from its foundation as a peace-based project to establishing itself as a globally relevant military and arms-exporting power. Arms lobbying companies and related corporations have been instrumental and highly influential in carving out this path for the EU. A pattern has emerged of institutionalising arms corporations in decision making processes at the highest levels of the EU. The allocated funds are facilitating and driving a new arms race on Europe's watch, understood in terms of competitiveness, innovation and strategic autonomy, with a total disregard for the death, devastation and destruction that will follow from the deployment of such arms. It is, once again, the arms companies that will reap the benefits of Europe's deadly defence and arms export policies with the real costs being borne out on the targeted populations. Put mildly, the reputation of these companies leaves a lot to be desired as we will see in the following chapter, which looks at corruption in the arms trade.

Allocation of PADR and EDIDP funding:
companies

Legend:
- Leonardo
- Indra
- Safran
- Thales
- Airbus
- Saab
- Hensoldt
- Fraunhofer
- Others
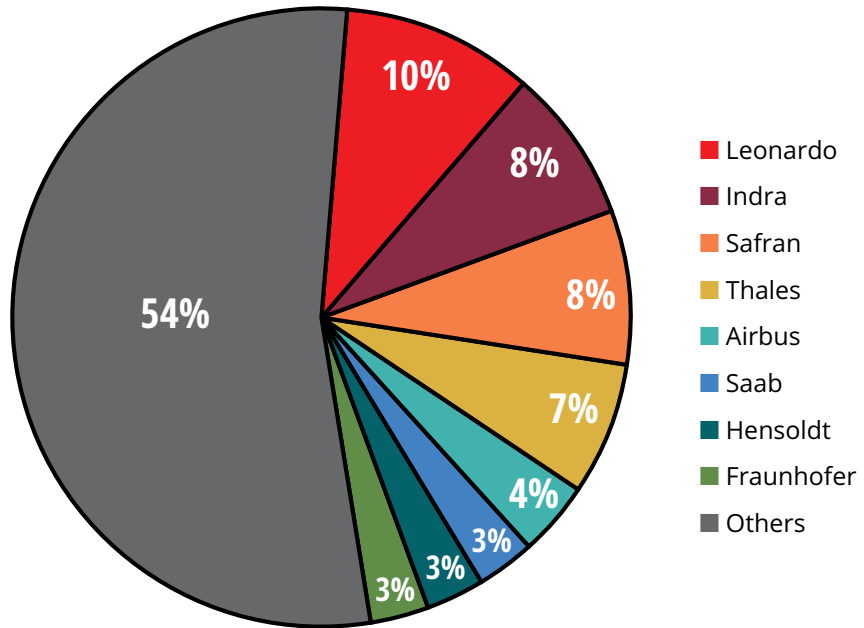
Allocation of PADR and EDIDP funding:
countries

Legend:
- France
- Italy
- Germany
- Spain
- Greece
- Sweden
- Estonia
- Belgium
- Others

02

CORRUPTION AND THE ARMS TRADE

By Andrew Feinstein and Alix Smidman

Of the eight largest beneficiaries highlighted in Chapter 1 – which account for 45.9% of the PADR and EDIDP funding allocated to date – five have had substantial corruption allegations levelled against them or their associated companies. Before getting into the specifics of the companies on which this report focuses, we first situate the findings within the broader debate on corruption and the arms trade.

International corruption is damaging to both purchasing and exporting countries alike, undermining democratic practice, the rule of law and socio-economic development. The particular features of the arms trade have led to it being uniquely and disproportionately corrupt. According to one estimate, it accounts for 40% of corruption worldwide although it represents only a relatively small share of international trade.[136]

Aspects of the arms trade which allow it to facilitate corruption on such a huge scale include:

- government secrecy, justified on the basis of national security and commercial confidentiality
- the close connection between buyers, suppliers and brokers
- the highly technological and globalised nature of arms production, including the transport and financial networks which facilitate arms transfers, some of which are virtually impossible to trace
- procurement pressures
- the high financial rewards with few consequences.[137]

The most common corrupt practices include bribery, the failure to declare a conflict of interest, the promise of employment, and the offer of preferential business access.[138] Corruption in the arms trade results in military procurement being determined not on the basis of the most appropriate equipment but by who pays the biggest bribes. This leads to higher spending on military hardware, both as a share of gross domestic product (GDP) and total government spending, as well as the purchase of equipment that is inappropriate for a country's needs, and is a waste of public resources.[139]

Although the defence sector is particularly prone to corruption as outlined above, there have been few effective investigations, prosecutions and convictions in relation to arms transfers. The same aspects which allow the trade to facilitate corruption also make it particularly difficult to prosecute. The number of criminal cases ending in conviction or even a fine, particularly with an admission of guilt, is very low, though often a plea agreement is accepted in lieu of an admission of guilt.[140] Nevertheless, there is significant evidence in the public domain related to all of the allegations linked to the companies listed below, which at the very least suggests a significant risk of corruption. For these very reasons, investigations tend to be protracted, meaning that some of the corrupt behaviour outlined here stretches back over 20 years, but meaningful information related to the companies' behaviour has emerged only recently. Most of these case studies demonstrate a repeated and endemic pattern of corruption in the companies' international dealings and should at least raise serious questions about their suitability to receive EU funding.

1. LEONARDO

Leonardo is the single biggest recipient of EU defence funding receiving €28.71 million thus far. Leonardo SpA, previously called Finmeccanica, and partly owned by the Italian state, has been embroiled in many corruption scandals around the world for many years involving Leonardo directly, as well as its subsidiaries. In the 2000s one of Leonardo's key income streams was its helicopter division which until 1 January 2016, was considered a subsidiary of Leonardo, known as Anglo-Italian multinational, AgustaWestland. It formally merged into Leonardo in 2016.[141] Corruption scandals linked to the company, often implicating senior management, have led to criminal and civil cases across multiple jurisdictions including Italy, India, Panama and South Korea.[142] In April 2021, Leonardo bought a 25% stake in Hensoldt, which also receives substantial funding from PADR and EDIDP.[143]

South Korea

In a typical rotating door move, Geoff Hoon, who was the UK defence secretary from 1999 to 2005 in Tony Blair's Labour government,[144] went on to become AgustaWestland's Manager of International Business from 2011 to 2016. In 2013, the company, while under Hoon's management, secured an order to sell eight Wildcat helicopters to the South Korean military. According to court documents from South Korea, AgustaWestland paid individuals with links to the South Korean military establishment to secure the deal. Furthermore, the documents show that Hoon employed a lobbyist for the sale, who was eventually convicted for *illegal intermediation'* (paid lobbying) in 2016.[145]

India VVIP Helicopters

On 8 February 2010, AgustaWestland signed a € 556 million contract to supply 12 AW101 helicopters to the Indian government. It emerged that the company had paid over €60 million to agents and intermediaries to secure the deal, a substantial portion of which was overseen by AgustaWestland's UK headquarters. The company also paid one of these agents in relation to other procurements in India. India's authorities alleged that the agent undertook no legitimate work on those additional contracts, which the agent contests.[146]

The two most senior Finmeccanica employees to be accused of corruption in relation to the deal, Giuseppe Orsi and Bruno Spagnolini, were acquitted in a controversial Italian Supreme Court decision in 2019. Before the announcement that criminal charges were being brought against the two in 2014, AgustaWestland had entered into a settlement agreement with authorities in Milan, with a further settlement agreement entered into with one of AgustaWestland's primary agents in the VVIP deal, Guido Haschke.[147] Both settlements took the form of a *patteggiamento*, a legal formulation in Italy allowing an accused person or company to reach a financial settlement or a short prison sentence. This does not strictly constitute an admission of guilt, but the settlement must be approved by a judge who has a substantial belief that there is a case to answer. As a result, legal scholarship tends to consider *pattegiamentos* to be a de facto ruling of guilt, even if in the strictest of legal terms that is not the case.[148]

While criminal prosecutions are now closed in Italy, this remains a live criminal investigation and prosecution in India. In September 2017, India's Criminal Bureau of Investigation filed a fresh charge indicting various parties, including Finmeccanica/Leonardo, AgustaWestland Ltd, western agents, two Indian officials and a range of other Indian companies and individuals.[149]

Panama

In late 2010 the Government of Panama signed contracts worth just over €180 million with three separate Finmeccanica subsidiaries to enhance the country's ability to tackle organised crime and drug trafficking. The Italian branch of AgustaWestland was contracted to supply six patrol helicopters; Selex Sistemi Integrati to supply a radar system to track vessels at sea; and Telespazio Argentina to develop a topographic mapping system. The most expensive part of the package, the US$ 90 million radar system, was reportedly ineffective in its main function of tracking small vessels. Allegations soon emerged that kickbacks were paid to the former President of Panama, facilitated by an Italian business person with close links to the former Prime Minister of Italy, Silvio Berlusconi.[150]

The Supreme Court in Panama, after the case was brought forward by the government to cancel the radar contracts, placed it under provisional suspension. The Court concluded that *'there are credible indications that the formation of the disputed contract, there was a misuse of power, as it was done to obtain personal gains of an illicit nature and not for public interest'.* Moreover, the Court appeared to suggest that all three of Finmeccanica's contracts with the Panamanian government were tainted in the same way. After the Supreme Court's ruling, the company came to a negotiated settlement with the Panamanian government in February 2016.[151]

MBDA

MBDA was formed as a joint venture by a merger of the guided missile divisions of EADS (now Airbus), Finmeccanica (now Leonardo) and BAE Systems in December 2001.[152]

Significant corruption concerns regarding Airbus and Leonardo are outlined in this section, while BAE has also been implicated in corruption scandals concerning vast sums paid in bribes in many countries – making a plea deal in both the US and UK in 2010 in relation to a wide range of corruption allegations. The company admitted to lesser charges of false accounting, paid a fine of US$400 million in the US and £500,000 in the UK, and agreed to make an ex gratia payment of £29.5 million towards development programmes in Tanzania.[153]

2. SAFRAN

Safran is the third largest recipient of EU defence spending receiving €22.33 million thus far. Safran, a French company part-owned by the state, was fined €500,000 in 2012 for paying bribes to Nigerian officials between 2000-2003, to secure a contract worth $214m to produce national ID cards.[154] The conviction was overturned in 2015, with the Paris Court of Appeal declaring the offence of bribery was insufficiently grounded. The French Financial Prosecutor, in response stated that: "*the rules on the criminal liability of legal persons are no longer appropriate for the way in which large international corporations operate.*" This reflected contemporary criticisms by the OECD of France's very low number of corporate prosecutions, particularly concerning French companies allegedly committing bribery abroad.[155] [156] In fact the first court of first instance, while acquitting the two company officials on trial, found that they had *"undeniably facilitated the corruption offence by acting on behalf of the company as part of a general, organised and coherent framework for paying commissions to intermediaries."* The company was also fined 29 million euros in 2017 in relation to the sale of Mirage jets to Taiwan in 1992, which also implicated Thales and Dassault.[157]

3. THALES

Thales is the fourth largest recipient of EU defence spending receiving €18.64 million thus far. Thales, previously known as Thomson CSF, has been heavily implicated in a number of corruption cases in many countries.

Both the French state and Thales were fined €630 million in 2011, of which Thales was liable for 27.5%.[158] The fine was linked to Thales paying commissions to intermediaries to secure the sale of six navy frigates to the Taiwanese navy in 1991. A naval officer was found dead in 1993 when it is suspected that he was about to blow the whistle on influential figures who had allegedly benefited from Thales securing the deal.[159]

In 2002, Thales' subsidiary DCNS, then DCN, paid a €114 million commission to a shell company owned by a close associate of Malaysia's former defence minister to secure the sale of two Scorpene submarines. DCNS also paid a Hong Kong company, owned by the same associate as well as his father, €39 million for a document alleged to describe the Malaysian military's specifications for the submarine purchase. Thales' Asia division was also implicated in paying bribes.[160]

In a separate case to the one mentioned above, Thales was fined a further €64 million by Taiwan in 2017 in relation to the sale of Mirage jets in 1992.[161]

DCNS was implicated in a scandal known as *L'affaire Karachi.* This involved paying massive commissions to secure the sale of three Agosta 90 Submarines in 1994.[162] At the time when the deal was first agreed it was legal to pay bribes abroad to secure business. This changed in 2000 when France signed the Organisation for Economic Co-operation and Development (OECD) Bribery Convention. Two Franco-Lebanese business people were allegedly given commissions of 216 million francs (€33 million) in relation to the deal.[163]

In the same year, DCNS used these business people as intermediaries for the sale of three frigates to Saudi Arabia, with each given €30.5 million to be paid to Saudi officials.[164] Some of the money for commission payments in Pakistan and Saudi Arabia was channelled back to France in so-called 'retrocommissions', to fund the 1995 presidential election campaign of Edouard Balladur, the Prime Minister at the time.[165]

There are also allegations that in relation to the VVIP Chopper Deal in India in 2016, Dassault Aviation and Thales paid an Indian business person €15 million to influence the signing of the deal. The same companies were implicated in AgustaWestland deal outlined above.[166]

The company is also accused of paying former President of South Africa Jacob Zuma an annual sum of US$34,000 from 1999 onwards, in exchange for facilitating an arms contract and for protecting the company from an investigation into the deal.[167] The contract was part of the multi-billion-rand Strategic Defence Procurement Package which was signed on 2 December 1999, from which Thales received ZAR2.6 billion. Thales is alleged to have paid a number of intermediaries to pay bribes in connection with the deal, and stands as a co-accused along with Zuma in an ongoing, high-profile corruption trial in South Africa.[168]

In 2018, Yannos Papantoniou, the former defence minister of Greece, was jailed for accepting US$2.81 million in kickbacks, linked to a 2004 naval defence contract signed between Greek Shipyards and Thales Nederland BV.[169] There were also allegations by a former Thales employee that the company maintained a 'slush fund' to bribe politically connected individuals, in order to secure a security contract for the Olympics that same year.[170]

In 2020, the US department of Justice launched an investigation into whether a joint venture between Thales and Raytheon Systems had been making 'improper payments' to certain countries in the Middle East since 2014. This was launched in parallel to a SEC investigation into improper payments made either by the companies or entities acting on their behalf.[171]

4. AIRBUS

Airbus is the fifth largest recipient of EU defence spending receiving €10.17 million thus far.

In early 2020, Airbus was forced to agree to paying fines of nearly €3.7 billion to settle bribery charges, after a deferred prosecution agreement was reached with France, the UK and the US.[172] The company was said to be paying large bribes since at least 2008, on an *'endemic'* basis, to secure contracts in 20 countries,[173] including Austria, Brazil, China, Ghana, Indonesia, Japan, Kuwait, Malaysia, Russia, Sri Lanka, Taiwan and Turkey. While aspects of the case were published, no names were revealed.

Significant information has emerged, however, on Airbus' corruption in relation to the 2003 Austrian Eurofighter deal. In its settlement with the US Department of Justice, the company acknowledged that it had paid commissions of €55 million to 14 different individuals.[174] However as is considered commonplace with many US agreed Deferred Prosecution Agreements (DPAs) concerning defence companies, the DPA stopped short of specifically confirming that the payments were intended as bribes.[175] Investigations are still pending in Austria, which, despite the various settlements between Airbus and authorities around the world, continues to allege criminal bribery in the matter. In February 2020, Austrian prosecutors announced that they had widened the scale of their investigation into the Eurofighter purchase following additional information from a whistle-blower.[176]

In Germany, in an investigation concerning the same deal, the company opted to settle by paying a fine of US$99 million in 2018. Despite this, Airbus was allowed to continue to deny criminal guilt, while German prosecutors agreed not to allege further corruption.[177] After this was announced Ghana also decided to probe Airbus' conduct in the country, regarding accusations of bribery to secure the purchase of three military planes between 2009 and 2015, a matter which is ongoing.[178]

GPT Special Project Management

In April 2021, GPT, Airbus's Saudi-based UK subsidiary, pleaded guilty in the UK to a corruption charge related to a government-to-government contract between the UK's Ministry of Defence (MoD) and Saudi Arabia's National Guard.[179] GPT had been the MoD's prime contractor on the communications project known as SANGCOM. GPT was ordered to pay £28 million, plus £2.2 million in costs, for offences which occurred between December 2008 and July 2010.[180] The case was initiated after Lieutenant Colonel Ian Foxley in December 2010 came across a three-year email trail detailing the efforts of the company's former Chief Financial Officer, Michael Paterson, to get potentially illegal payments investigated within Airbus. In late 2007, Paterson refused to authorise payments being made by GPT to subcontractors based in the Cayman Islands for what appeared to be non-existent services.[181] There were also concerns about donations of luxury vehicles to key staff in the Saudi National Guard, plus the lease of a villa from a military general on unusual terms, prior to the signing of a new contract.[182]

5. SAAB

Saab is the sixth largest recipient of EU defence spending receiving €10.07 million thus far.

South Africa

SAAB and BAE were jointly contracted to supply Gripen jets to South Africa in 1999.[183] In 1998, BAE bought a 35% stake in the company. SANIP, a joint BAE-SAAB enterprise, entered into contracts with a consultancy company owned by Fana Hlongwane, who was an advisor to the defence minister at the time. The contract stipulated that Hlongwane's company would receive a bonus of ZAR22.5 million if the government honoured the 'third tranche' of weapons. The arms deliveries had been separated into three tranches to ensure that the country did not suffer adverse economic effects in relation to the deal. This 'bonus' was also dependent on BAE being awarded a particular level of credits for its industrial participation programme with the government, i.e. offsets. Further advantageous alterations to the deal were made subsequently, which saw Hlongwane paid ZAR72.9 million in 2004 and 2005, as a result of the South African government's decision to opt for the third tranche.[184]

Czech Republic and Hungary[185]

Both the Czech Republic and Hungary initiated tenders in 2000 to buy new fighter aircraft. Saab, again in a joint venture with BAE, looked to sell both countries the Gripen International. Eventually after a larger deal fell through, the Czech Republic signed a US$750 million deal in 2004 to lease 4 Gripens for ten years. Hungary, despite initially appearing to opt for the US F-16, also selected the Gripen. There are allegations that these decisions were influenced by commissions of at least €12.6 million paid to politicians in both countries via a network of intermediaries and shell companies operating in Central Europe. This includes Alfons Mensdorff-Pouilly, an Austrian count,[186] who was also reportedly commissioned by BAE, Saab's marketing partner, to secure the Austrian tender for the Gripen.[187]

The UK's Serious Fraud Office (SFO) began an investigation in 2004, as part of a wider probe related to BAE's dealings. In total, investigations were pursued in eight countries including the US.[188] The SFO dropped charges against Mensdorff-Pouilly in February 2010, after BAE's plea deal in the US and UK. He was later charged in an Austrian court with money laundering, in connection with €12.6 million received in bribes, allegedly to influence the Gripen purchase in Hungary and the Czech Republic, He was acquitted in 2013, but convicted on a lesser charge of falsifying evidence. The judge emphasised that the *'whole thing stinks',* but prosecutors struggled to prove who had received the bribes.[189]

In conclusion, it is extremely troubling that defence companies whose activities have been besmirched by extensive and vigorous allegations of corruption are receiving money from the EU. It suggests that either the EU has no interest in fighting corruption, or it is oblivious to the mis-spending of defence funds in ways which undermine both the rule of law, the democratic process and public safety.

CASE STUDIES

[]3

FRANCE

The EU's largest arms exporter receives the largest portion of EU defence funding

By Tony Fortin

France is the largest single beneficiary of PADR and EDIDP, with 26.44% of the allocated budget, followed by Italy, Germany and Spain, which receive 14.38%, 14% and 13.72% respectively.[190] France, with a €48 billion military budget in 2020,[191] is the EU country most engaged in military operations and has been the largest European arms exporter over the past five years. The French government was therefore far keener on the EDF than more 'frugal' countries. When Finland, while holding the EU presidency, proposed to lower the EDF to €6 billion, French defence minister Florence Parly disagreed and called for respecting the initial €13 billion budget proposal: *'more is needed, which is why France, Germany, Spain and Italy have written to the High Representative and the other defence ministers of the European Union: we need an ambitious EDF, and today more than ever'.*[192] In general, France favours greater European cooperation, provided it serves its interests. This was recently illustrated by President Macron's calls to EU allies after France lost a submarines contract that had already been signed with Australia.[193] Four countries monopolise the EDF – France, Italy, Spain and Germany – and these are also the most involved in EU military missions.[194] The Commissioner who is in charge of the space and defence industry since 2019 is French national Thierry Breton. This is despite a clear conflict of interest because his former company, Atos, stands to benefit from EU funds, including through programmes under his mandate.[195] Thierry Breton maintains very strong national ties, both industrial and political, and has also gained such a degree of influence inside the European Commission that he is considered a de facto Vice-President.[196] Other EU officials confirm this strong French influence in the European defence policy sector: François Arbault is Director for Defence Industry at the European Commission, Anne Fort is the Defence Industry and Market Policy Head of Unit at the European Commission, Alain Alexis is an adviser for synergies space, defence and civil Industry at the European Commission, Hervé Bléjean is director-general of the EU military Staff at the European External Action Service (EEAS), and Charles Fries is Deputy Secretary General for Common Security and Defence Policy and Crisis Response at the EEAS. At the legislative level, French MEPs were Rapporteurs or shadow Rapporteurs in the decision-making processes about EU military funding.[197] The EDF precursor programmes largely benefit French companies. France is involved in 149 projects (21% of the total), and coordinates 16 out of 62 projects (25%). On the basis of the known provisional amounts, the companies most involved are Safran (€22 million), Thales (€13 million), and MBDA (€5 million).[198] Other beneficiaries include civil institutions like French universities or elite graduate schools (Université de Limoges, CNRS, Ecole supérieure de physique et de chimie industrielles de la ville de Paris), as well as consultancy firms in the civilian area (Erdyn consultants or Ayming).[199]

Beyond the industrial benefits, the R&D projects also serve French geopolitical interests. France has one of the largest maritime jurisdictions due to its colonial presence in remote territories in the Pacific and Indian Ocean. These are valuable to France in a context where offshore gas has been discovered off the coast of Yemen and in the East Africa rift.[200] In 2019, France announced a military cooperation agreement with Ethiopia and the transfer of naval technology to Kenya;[201] the establishment of a Franco-Indian patrol in the Mozambique Channel;[202] and the construction of

20 new ships[203] and maritime drones (two per ship).[204] At the same time, the oil and gas company, Total, signed new contracts in Mozambique, Namibia and South Africa and owns assets in Ethiopia.[205] Since 2017, Total's gas liquefaction site in Yemen has been set up as a military base and a secret prison.[206] The gas factory Balhaf is also a base for the future offshore oil and gas explorations in the Gulf of Aden.[207] In the Pacific region, a submarine contract was signed with Australia in 2016 (and rescinded by Australia in 2021), and there are current negotiations to sell Rafale to Indonesia.[208] In the Mediterranean region, a frigates contract was signed with Greece in 2021.[209]

This neo-colonialist strategy of securing economic interests with military and political decisions has long been supported by the EU, which since 2008 has allowed EU members to pool their efforts in naval defence through a military anti-piracy mission in the Gulf of Aden (initiated by France), and the EU strategy in the Gulf of Guinea (2014) – where France has a permanent naval presence. Another European military mission in the Indian Ocean region was recently launched in Mozambique, led by Portugal and France,[210] and a new 'coordinated maritime presence' should be established in the Indo-Pacific region in early 2022, an area of particular interest for France – although several EU member states would prefer the EU to focus on areas closer to home.[211] This pooling of resources seems to be extended within the EDF, which brings together participants from European naval programmes (Italy, Spain or the Nordic countries) on the satellite surveillance research projects, such as Nemos and Padic (both EDIDP 2020 funded projects), which are seen as an essential investment for maritime monitoring and surveillance. Research on naval anti-mine drones, promoted by Naval Group and Thales, is also financed by the EDF.[212] Thales owns shares in Naval Group and takes the lion's share of the projects financed – the company is coordinating five projects. Some Naval Group subcontractors also benefit from the EDF such as Prolexia and Techlam in the field of maritime surveillance.[213] This research area will also be amplified by AI projects involving EU member states in eastern (e.g. Czech Republic and Slovenia) and northern Europe (Denmark, Estonia, Latvia and Sweden) that are specialists in maritime affairs.[214]

The EDF will almost certainly strengthen French policy in the Indian and Pacific Ocean areas: the race for offshore gas in Mozambique,[215] Tanzania[216] and Yemen, facing war and displacement; the destabilisation of Madagascar already ongoing;[217] and pressures in New Caledonia where there is a strong independence movement. The EDF also funds Austrian companies Madritsch and Itec Ton Technik, subcontractors of the Australian Schiebel, which equips the French Navy and are likely to provide the drones in the Indian Ocean.[218] The same drones were also sold within the 2013 contract to supply CMN patrol boats to Mozambique, intended for the surveillance of offshore gas exploitation. These powerful Schiebel drones make it easier for France and its allies like the United Arab Emirates (UAE) to 'control' the Mozambican maritime borders and 'monitor' the insurgency and population.[219]

France will also take advantage of EU funding to fill the technological gap, particularly in the field of drones and robots, by associating its companies with those in other member states, which are more advanced in this field. These industrial partnerships are accompanied by closer military ties: Estonia and the Czech Republic joined the Takuba Force in 2020 and 2021 respectively,[220] which brings together the special forces of several EU countries that are militarily involved in the Sahel.

The EDF also addresses other areas covered by France, such as electronics/communication in fighter jets with Thales DMS, research on high-precision artillery with Nexter and missiles technology with MBDA and Roxel. Most of these companies are involved in the arms exports used in Yemen, for instance.[221]

IRELAND

How a 'neutral' nation is growing its defence industry spurred on by EU money

By Angela Hegarty

Ireland is a small EU member state with a long tradition of military neutrality and below-average GDP spending on defence, which has fallen from 0.81% in 1999[222] to 0.3% in 2020.[223] There has been significant criticism in Ireland of the underfunding of the defence forces, especially in relation to pay, conditions and accommodation. A Commission on the Defence Forces was established in December 2020 and a report was published in December 2021.[224] Although the Defence Ministry has said that 'Ireland [does] not have a defence industry',[225] a group that represents the sector in Ireland estimates that 'there are approximately 548 foreign and domestic firms active in the Irish defence ecosystem with the defence sector supporting approximately 1,739 ICT jobs in Ireland'.[226] In 2020 Ireland exported €42 million in defence goods, mainly to the US, including personal firearms, mining explosives, aircraft components, ground vehicles, electronics and computer software.[227]

Ireland and the EU's Defence and Security Architecture

Ireland sees engagement with the EDF, its pilot programmes, and indeed the whole of the EU Defence and Security architecture, as an opportunity to beef up its capacity in security and defence through 'access to research and information on developing and maintaining professional capabilities and research that we cannot self-generate'.[228] Ireland regards the EDF as 'essentially an internal market instrument made up of different public funding tools to promote research and development in military projects, as well as complementing national investments to incentivise collaboration in joint development, research and acquisition of new defence capabilities'.[229]

Applied Intelligence Analytics Limited, a developer of data analytics software, is currently the only Irish firm participating in PADR or EDIDP projects. It is part of a consortium of 15 organisations, drawn from Bulgaria, Cyprus, France, Greece, the Netherlands and Spain, working on the Development of Unmanned Semi-fixed Sea Platforms for Maritime Surveillance.[230] The company has previously participated in two other EU-funded security/defence projects.[231]

The Irish government has signalled that it intends to expand its defence and security sector by leveraging the funding available from the EDF.[232] It has undertaken a number of initiatives to facilitate 'greater engagement with academia and enterprise to develop and exploit emerging and disruptive technology developments to support defence capabilities, while also supporting wider access and market engagement for Irish research by academia and enterprise'.[233] These include the hosting of 'high level seminars' on EU Funding for Irish Defence and Security Enterprise and R&D, at which 'the EU Commission, the European Defence Agency, and European Defence Industry presented on the European Defence Fund, Defence Tech Engagement, and over the EU budgetary cycle 2021–2027'.[234] It commissioned a feasibility study[235] which led to the establishment of a 'Civil-Military Research Technology and Innovation Unit',[236] involving Irish defence forces personnel who worked with the EDA.[237] Writing in the study, the Secretary General of the Department of Defence and the Chief of Staff of the Defence Forces observed that '[d]evelopments at EU level are also placing defence capability development on a new footing with significant funding now available for research and capability development in support of the Common Security and Defence Policy…

there is dual opportunity arising whereby Defence can incorporate innovation into its capability development processes, whilst also supporting Irish research institutes and enterprise in accessing the new funding streams to deliver these capabilities'.[238]

'Innovation in Defence was one of the goals of *Innovation 2020* – Ireland's 'strategy for research and development, science and technology'.[239] Key to that was the 'Defence Enterprise Strategy'[240] and the establishment of a Security and Defence Enterprise Group 'to bring together enterprise and academic researchers and practitioners in the areas of security and defence with the purpose of identifying areas of common endeavour and collaboration...to support Ireland-based enterprise in its engagement with the European Defence Agency (EDA)'.[241] It is notable that the *Ireland France Joint Plan of Action 2021–2025*[242] and the *Germany – Ireland Joint Plan of Action for Enhanced Bilateral and EU Cooperation*[243] both promise increasing security collaboration through the EDF mechanism.

Along with the other EU defence initiatives, in Ireland the EDF is driving a militarisation of research and industry,[244] providing 'a powerful financial incentive to develop these capabilities, bringing together large industries, SMEs and MidCaps'.[245] Ireland plans to capitalise on that by engaging with the organisations best placed to access EDF funding which 'are involved in nanotechnologies, data analytics, artificial intelligence, digitalisation'.[246]

Ireland's Neutrality

Despite the country's longstanding policy on military neutrality, the government has taken a strategic decision to 'scale up its investment in Ireland's influence on international developments... including security'.[247] That means an expansion of engagement with the EU Defence and Security sector, which has been evolving ever since Ireland began working with the EDA in 2004. Ireland joined PESCO in 2017, but only after a heated debate in Dáil Éireann (the elected chamber of the Oireachtas, the Irish Parliament.) Although there were furious objections from the opposition, the motion was carried by 75 votes to 42.[248] Nonetheless, the move 'triggered a serious debate on the future of Irish security and foreign policy and transformation of the traditional principle of military neutrality'[249] and paved the way for increasing interaction with the EU defence and security sector. It is clear that Ireland 'as a committed and contributing part of the EU family' realised that 'the rise of Europe as a security actor in its own right will open up opportunities for Ireland'.[250]

Ireland is particularly proud of its ability to 'punch above its weight' in global affairs, leveraging its status as a small, non-aligned country and its track record in peace-keeping. Recently described by *The Economist* as having 'a good claim to be the world's most diplomatically powerful country',[251] it used that ability in influencing, along with other EU countries, the shape of the EDF 'to ensure that Irish interests, particularly in the area of opportunities for SMEs were strongly represented'.[252]

Scrutiny and Opposition

The impact of Ireland's engagement with the EDF on its neutrality and the wider implications for its participation in the global arms trade are regularly raised by politicians and civic leaders.[253] For example, in the Dáil Éireann debates on the EDA the issues were raised repeatedly by members from several opposition parties.[254] The issue is frequently the subject of questions from opposition politicians and as recently as April 2021, the issues were again discussed in a debate on Ireland's participation in an EDA project on maritime surveillance.[255] Concern has also been expressed at all of these developments by a range of civil society organisations, such as the Irish Congress for Trade Unions which condemned Ireland's decision to join PESCO and access the EDF as 'leading

to a massive annual increase in military expenditure 2021-2027 by the EU. Consequently, this will result in a massive increase in Irish military expenditure, thereby reducing monies available for investment in social expenditure such as health, housing, and pensions'.[256] There is a lack of transparency over how much Ireland contributes financially to the EDF – the question is often asked by opposition TDs and the answer is always: 'Member State contributions to the EU Budget... is general, and is not assigned to any particular fund. As such, the EDF does not have a defined cost to the Exchequer. Ireland's contributions go into the general pool of revenue that funds all EU budget expenditure, including the EDF'.[257] The Minister for Defence recently stated at a seminar on EU funding for the Irish Defence Sector that 'Ireland contributes on an annual basis to the EDA, not just financially – there are currently two Irish personnel, one civil, one military on secondment to the EDA'.[258]

It is also difficult to ascertain exactly what is Ireland's contribution to the EDF Expert Group as despite Ireland 'participat[ing] on the 15 occasions the expert group has met... [it] is a working group and not a programme committee, there [fore] no minutes are available'.[259] Nor have the notes of the EDF programme Committee Group appeared, despite a statement by Defence Minister Coveney in June 2021 that 'it is the European Commission's (DG DEFIS) intention to make the summary reports of the meetings available online as soon as they have been approved'.[260]

Conclusion

Despite its long history of neutrality in defence, Ireland has chosen to become more closely engaged in the EU defence infrastructure. This has been facilitated by a confluence of factors, namely:

- a right of centre government that has been in power in one form or another for decades;

- a long standing economic strategy of privileging foreign direct investment and not asking any hard questions about it;

- a newly acquired drive to become a player on the global stage;

- the extreme unpopularity of Brexit in Ireland, making criticism of the EU in public difficult and scrutiny of the government's engagement with it tricky;

- the opportunities presented by the EU's defence networks to develop an indigenous defence industry which have the added benefit of plugging a funding gap for Ireland's' defence forces which has lately become a political embarrassment.

These combine to trump the imperative of Ireland's long standing neutrality. But the political cost of disrupting that policy has resulted in a refusal by the government to be transparent about the consequences of that approach. Ironically, it is Ireland's neutral status which has provided so much of its soft power, but that point seems to have been missed in the move to capitalise on the global access it has provided. It remains to be seen if Ireland's embrace of the arms trade will damage its international reputation.

THE NETHERLANDS
Co-financing and industry support

By Mark Akkerman

The Dutch government appears to be satisfied with the PADR, EDIDP and EDF initiatives and regulations. During the EU-level negotiations, the Ministries of Defence and of Economic Affairs kept in close contact with industry, organising meetings and consultations to keep companies updated and to ask for their input.[261] This is part of a more worrying trend of increasingly close relations between government and industry, in which the arms industry is, for example, requested to contribute to policy-making.[262]

In relation to EU funding, this trend has continued, with the Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland (RVO) – a government agency working under the auspices of the Ministry of Economic Affairs and also acting as a contact point for the Ministry of Defence – and the Dutch arms industry lobbying organisation, Netherlands Industries for Defence and Security (NIDV) working closely together to organise information and network meetings and coordinate other forms of support for companies interested in participating in the EDF and its precursor programmes.[263] For the most part, NIDV plays a general role in communications between government and industry. In August 2021, the NIDV director Ron Nulkes was appointed to the Commission Expert Group on policies and programmes relevant to EU Space, Defence and Aeronautics industry. This group, established by DG DEFIS, assists the European Commission in preparing and implementing regulations, policies and programmes regarding defence, space and aerospace matters.[264] The expert group comprises members from large arms companies, research institutes and business associations.[265]

The Dutch government set up an Interdepartmental Coordination Group for European Defence Cooperation ('Interdepartementale Coördinatiegroep Europese Defensie Samenwerking'), 'to achieve the greatest possible participation of Dutch industry and knowledge in the EDF and also to achieve the best possible connection between the EDF and the Dutch defence needs'.[266] This brings together representatives from the ministries of Defence, General Affairs, Foreign Affairs, Finance and Economic Affairs with representatives from research institutions (TNO and others) and the military industry (including NIDV). At the EU level, the efforts are led by 'special envoy' Tom Middendorp, former commander of the armed forces. The group can, for example, put forward proposals for co-financing projects to the government.[267]

In terms of co-financing, the Ministry of Economic Affairs has made €20 million available for the period 2022–2024.[268] The Ministry of Defence can also co-fund projects it deems useful for its own ambitions, such as those connected to PESCO initiatives.

It is unclear how much money the Dutch government has granted to co-finance PADR and EDIDP projects. For reasons of 'commercial confidentiality' the government refuses to give details about which projects, consortia and companies it co-finances or by how much.[269] This is strange, as the EU contributions to projects, including the division between consortia partners, are published online. It has, however, mentioned in a letter to parliament that the Ministry of Defence co-financed the SEA Defence project.[270] The Dutch shipbuilder Damen coordinates this project, from the EDIDP 2019 Call, and is the only PADR or EDIDP project which is coordinated by a Dutch entity.

Dutch companies and research institutes participate in 23 of PADR and EDIDP projects, across 12 entities. While one of the focus points of the Dutch government is the participation of SMEs, it is mainly research institutes TNO, MARIN (Maritime Research Institute Netherlands) and NLR (Netherlands Aerospace Centre) that obtain funding.

Despite all the government support, the military industry is unhappy. Dutch arms companies have been complaining about arms-export policy for years. They argue that the government implements the criteria of the EU Common Position on Arms Exports, to decide whether to issue a permit for an intended export, more strictly than other EU countries and thus undermines the so-called 'level playing field' among EU member states. Now, the industry has voiced its 'fear' that Dutch companies will be excluded from EDF projects because of the 'strict' Dutch policies.[271] Companies from other countries apparently do not want to risk buying Dutch arms components because the Dutch government might not permit that the total weapons system, which would include these components, be exported.

The right-wing coalition parties VVD and CDA often act as though they are parliamentary spokespersons for the military industry. They proposed a bill that would bring to an end an independent Dutch arms-export control regime by almost always automatically allowing the export of arms components to other EU countries and relying on their policies in further exporting the assembled weapons to other states. One of the specific proposals of both parties reads: 'The Netherlands gives permission for the export of parts of a weapons system to third countries if the end product is built with funding from the EDF, and the builder of the main weapon system has granted a permit'.[272] Though the wording in the December 2021 coalition agreement from the new government is a bit vague, it suggests that it plans to ease arms export restrictions in line with this proposal.

04

WHAT IS BEING FUNDED?

An analysis of the weapons technologies

By Pere Brunet

INTRODUCTION AND OVERVIEW

This chapter looks at the technologies funded under 18 PADR projects and 16 EDIDP projects, characterising the nature and scope of the projects by keywords, identifying their technological capacities, and establishing the level of controversy and risk they pose.[273]

Methodology:

The keywords we used for this analysis are based on the texts of the call published for the EDIDP 2019 and the descriptions of the PADR and EDIDP projects as posted online. An initial list of keywords was drawn up, which was subsequently refined to ensure that all of the key concepts that would be funded under these budget lines were taken in to account. By focusing on the keywords we were able to characterise the different projects and identify the technologies funded in each one. We could then draw conclusions regarding the technological aspects of each project and extract trends across projects to build an overall picture of what exactly is being funded by the EU under the aforementioned budget lines.

We identified seven PADR-funded projects and seven EDIDP-funded that aim to provide basic integration and decision-support tools for the European Strategic Command and Control System (C2), and improve interoperability among national armed forces in EU member states. The remaining projects involve specific technologies. We briefly introduce these two groups of projects in the next two sections. We then present an analysis of the public dissemination activities of these projects to date, bearing in mind the delays in initiating many EDIDP 2019 projects mean that the precise findings are provisional. The section on the projects' technologies presents a global characterisation of the project activities in four categories:

- disruptive defence and protection projects
- projects including non-disruptive tools for defence and combat
- projects including disruptive tools for defence and combat
- disruptive combat system projects

The chapter ends with a discussion on the most controversial projects and technologies and those that might be developed in the future.

Projects, topics and keywords

Given that the topics are wide-ranging, following an iterative textual analysis of the EDIDP 2019 Call and the PADR and EDIDP project descriptions, we settled on 36 keywords. Before presenting these in Table 2, it is useful to set out some of the main abbreviations and acronyms used in the rest of the chapter.

Table 1. Common abbreviations and acronyms

AC	Autonomous Control
AE	Electronic Attack
C2	Command and Control Systems
CBRN	Chemical, biological, radiological and nuclear defence
EMRG	Electromagnetic Railgun. These weapons use electromagnetic forces to give projectiles very high acceleration
PNT	Navigation and timing systems
RPAS	Remotely Piloted Aircraft System is the term used by international aviation-related agencies rather than remotely piloted UAVs
US	Unmanned System
UAV	Unmanned Aerial Vehicle

Table 2. List of Keywords

Table 2 shows whether each keyword corresponds to a basic tool (i.e. infrastructure for other projects and developments), a technology, a specific military system (excluding combat systems and protection equipment), a disruptive combat system or a defence and protection system. Except for six technologies (AE, MC, PN, PR, SG and US) that also belong to specific military systems, the remaining keywords relate to a single category.

Acronym	Short name	Keyword	Basic Tools	Technologies	Systems	Disruptive Combat Systems	Defence & Protection Systems
AC	Autom_Control	Autonomous control, adapt to functionality changes		*			
AE	Electron_Cyber	Electronic Attack, Offensive & Defensive electronic devices, Cyber response		*		*	
AI	Artificial_Intellig	Artificial Intelligence		*			
C2	Command_Control	Command and Control Systems			*		
CB	CBRN	Chemical, Biological, Radiological and Nuclear Defence					*
CS	Cyber_Security	Cyber-security, Cyber situation awareness		*			
CU	Counter_UAV	Counter UAV Systems			*		
DG	Disrupt_Guns	Disruptive and novel guns (laser, electromagnetic)				*	
EO	Earth_Obs	Earth Observation Systems			*		
FD	Forecast	Forecast, decision-support tools	*				
FT	Feature_Recog	Feature recognition and tracking		*			
GG	Positioning	Galileo-based PRS7 military positioning		*			
IP	Image_Proc	Image processing		*			

Acronym	Short name	Keyword	Basic Tools	Technologies	Systems	Disruptive Combat Systems	Defence & Protection Systems
It	Integration	Integration, information fusion	*				
MC	Counter_Mine	Mine Counter Measures (MCM)		*	*		
MN	Mobile_Networks	Mobile ad hoc networks		*			
MS	Sea_Surveillance	Maritime Surveillance Systems			*		
MZ	Zone_Mapping	Automatic mapping of conflict zones		*			
PN	Navigation_Syst	Navigation and timing systems (PNT)		*	*		
PR	Protection_Syst	Protection Systems, active & passive dynamic camouflage adaptation		*			*
RF	Electronic_Radar	Electronic sensors & processing, Radar, escort jamming		*			
SC	Secured_Comm	Secured communications		*			
SD	Soldier_Syst	Soldier-disrupting equipment, soldier systems				*	
SF	Sensor_Fusion	Sensor data fusion, data integration		*			
SG	Soldier_Garn	Garments for soldier protection, garment optimisation		*			*
Si	Simulation	Simulation	*				
SP	Signal_Proc	Signal processing, encryption, secure communications		*			
SS	Sea_Security	Sea Security Systems, warships			*		
St	EU_Standards	European cross-industry standards	*				
TD	Target_Location	Target location & designation systems		*			
UA	Integration_Traffic	RPAS integration into air-traffic management	*				
UC	UAV_Comm	UAV communications		*			
UL	Low_Obs_UAV	Low-observable tactical RPAS			*		
UM	Manned_Unmanned	Manned-Unmanned teaming, hybrid systems	*				
US	Unmanned_Syst	Unmanned Systems, drone swarms, ground swarms		*	*		
VR	VR_Training	Virtual reality and augmented reality training		*			

Table 3. Topics in the EDIDP 2019 Call and Keywords

Table 3 shows the relation between these keywords and the topics in the EDIDP 2019 Call[274], listing only the 29 topics relevant to the projects examined in this chapter. Most of these can be directly inferred from the text of the Call or from the topics.

Topic	Keywords
Airborne electronic attack capability	Electron_Cyber
Augmented-reality combat helmet featuring night-vision and ally or enemy position display, including AI functionalities	Soldier_Syst Artificial_Intellig
Beyond Line Of Sight (BLOS) anti-tank capabilities	Disrupt_Guns Electronic_Radar Autom_Control Target_Location
Capabilities and equipment needed for establishing C2 system from strategic to tactical level, complementing existing European External Action Service systems	Command_Control
Combat jet training platforms	VR_Training
Command and control systems designated for individual soldier to Brigade Commander, post-logistic information system for maintenance, transport, medical, management	Command_Control Soldier_Syst
Cybersecurity solutions for the protection of the future security and defence systems (e.g. C2, logistic, embedded system, distributed simulation)	Cyber_Security Command_Control Signal_Proc Simulation
Development of a European protected waveform to secure defence satellite communications in peacetime, missions and operations	Secured_Comm EU_Standards
Development of a European standardised and sovereign Galileo PRS7 navigation receiver capabilities compatible with GPS/PRS solution for defence purposes	EU_Standards Positioning Navigation_Syst
Development of a low-observable tactical RPAS with the capability to provide near real-time information and with modern self-protection	Low_Obs_UAV Protection_Syst Target_Location?
Development of a minefields-mapping system using unmanned aircraft	Counter_Mine Unmanned_Syst Zone_Mapping
Development of counter-UAS capability based on mini-UAS swarms	Counter_UAV Unmanned_Syst
End-to-end solutions for AI in defence & security key strategic issues	Artificial_Intellig Target_Location
European Detect and Avoid (DAA) function based on new sensors and processing for RPAS integration into air-traffic management	Integration_Traffic Sensor_Fussion
Future Mine Counter Measures (MCM) capabilities operating autonomous underwater systems, coping with current capability gaps in securing sea lines of communication	Sea_Security Counter_Mine
Future effective and collective CBRN protection capacity to civil population, defence forces and their equipment	CBRN
Future soldier CRBN protection equipment and integration	CBRN Protection_Syst Soldier_Garn
Innovative intelligence tools for early-warning and countermeasure deployment support to counter CBRN threats	CBRN
Integrated maritime surveillance system, combining legacy assets with new, innovative solutions	Sea_Surveillance

Integration of a greater number of remotely human-operated unmanned systems, based on the development of future automated and autonomous platforms	Integration Autom_Control
Innovative software systems for processing of aerial images and videos through hyperspectral imaging (for metadata/telemetry information extraction and exploitation in C2 systems)	Integration Image_Proc Feature_Recog
Medical virtual reality training simulator	VR_Training
Modular and adaptive tactical networks to control, change and manage network behaviour, including cyber security	Mobile_Networks Electron_Cyber Signal_Proc
Multipurpose architecture for unmanned ground systems and solutions for systems integration and manned-unmanned teaming	Manned_Unmanned Integration
Nano-modified composite materials and related production processes and design procedures for reinforcement of existing armour of defence vehicles	Protection_Syst
Persistent Earth observation from space with automated interpretation of data and information, including AI, cloud-based solutions and real-time on-board processing by sensors	Earth_Obs Sensor_Fussion Artificial_Intellig Image_Proc
Secure high-capacity communications for UAVs in beyond line-of-sight applications	UAV_Comm Signal_Proc
Software suite enabling real-time cyber-defence situational awareness for defence decision-making and real-time cyber-threat-hunting and live incident response, based on shared cyber-threat intelligence	Forecast Electron_Cyber
Unmanned semi-fixed sea platforms	Unmanned_Syst Autom_Control

Half of the keywords listed in Table 3 appear in the text of the topics in the Call:

- Autonomous control refers to navigation control, including adaptation to real-time functionality changes. AI systems are usually driven by data-trained neural networks but are not in the projects listed related to attack functionalities.

- Command and Control Systems (C2) include developments to provide decision-support tools for the European Strategic Command and Control System.

- Chemical, biological, radiological and nuclear defence (CBRN) aims to develop protection systems against these agents.

- Image processing includes computer-based tools to process and enhance camera-captured images.

- Integration and information fusion are geared towards an integrated EU database of relevant information.

- Low-observable tactical RPAS refers to the development of remotely piloted drones for tactical purposes that are not easily detected by radar.

The remaining keywords, which are inferred from the description of topics in the Call, include:

- Mobile ad hoc networks aimed at developing adaptive tactical computer networks that can adapt to changes, modify their behaviour, and react to cyber threats.

- Electronic sensors and processing, including radar- and escort-jamming, refers to new electronic signal sensors (from radar and others) including actuators for the effective jamming of radar signals during escort missions.

- Soldier-disrupting equipment and soldier systems include novel protection, observation, communication and attack portable elements.[275]

- Sensor-data fusion and data integration refer to specific systems that merge data from different cameras and sensors, producing better-quality information.

- Forecast and decision-support tools includes developments to provide resources for a European forecast analysis, including decision support tools.

- Electronic Attack, offensive and defensive electronic devices, and cyber response, aims to develop offensive electronic tools, using the electromagnetic spectrum in combat, and ensuring that European armed forces can both use and deny it to adversaries.

- Cyber security and cyber situation awareness include defence tools against cyber attacks.

- Disruptive and novel guns, laser guns and electromagnetic acceleration of projectiles in place of chemical propellants.

- Feature recognition and tracking refers to developments for the recognition of objects and faces from sensor data (usually images), which can be used to detect and follow a person/object as it moves to keep them localised.

- Signal processing, encryption and secure communications are computer-based tools to encrypt and send data securely to the intended recipient.

TECHNICAL ANALYSIS OF THE PROJECTS FOCUSING ON BASIC TOOLS AND SYSTEM DEMONSTRATIONS

Seven each of PADR and EDIDP projects do not specifically focus on developing technologies, but rather to provide basic integration and decision-support tools for the European Strategic Command and Control System (C2), to improve interoperability among national security forces in the framework of the EU Common Security and Defence Policy. These projects, according to their tools and systems, are listed in Table 4. The PYTHIA, SOLOMON, DECISMAR and ESC2 offer forecast and decision-support tools, and INTERACT is aimed at supplying a basis for a future European interoperability standard for military unmanned systems. OCEAN2020, EUDAAS and PANDORA, with a combined total of EU funding of €63.4 million include major demonstrations of the integrated systems, as shown in Table 4.

Table 4. Projects on Basic Tools and Systems

4a) EDIDP projects		
Acronym	**Keywords**	**System Demonstration**
CROWN	Integration, Electron_Cyber, Signal_Proc, Electronic_Radar	
GOSSRA	Integration, Soldier_System, Secured_Comm	
INTERACT	EU_Standards, Umanned_Syst	
OCEAN 2020	Integration_Command_Control, Sea_Surveilance, Sea_Security	Yes
OPTIMISE	Integtration, Navigation_Syst	
PYTHIA	Command_Control, Forecast	
SOLOMON	Command_Control, Forecast	

4b) PADR projects				
Acronym	**Keywords**	**Activities**	**PESCO Project?**	**System Demonstration**
DECISMAR	Integration, Forecast, Sea_Surveillance	Study, Design, Prototype, Testing	Yes	
DRONEDGE-E	Simulation, Unmannded_Syst, Autom_Control, Artifical_Intellig	Study		
ECYSAP	Electron_Cyber, Cyber_Security, Electronic_Radar	Study, Design, Prototype, Testing, Qualification	Yes	
ESC2	Command_Control, Forecast, Secured_Comm	Study, Design	Yes	
EUDAAS	Integration_Traffic, Unmanned_Syst	Study, Design, Prototype, Testing	Yes	Yes
PANDORA	Integration, Sea_Security, Electron_Cyber	Study, Design, Prototype, Testing	Yes	Yes
SEA Defence	Sea_Security, Autom_Control	Study	Yes	

Projects providing integration tools
PADR: CROWN, GOSSRA, OCEAN2020 and OPTIMISE
EDIDP: DECISMAR, EUDAAS, PANDORA and SEA Defence

The CROWN project[276] integrates electronic functions for military applications into one system, including radar, electronic warfare and communication, with no restrictions on who ultimately deploys them. The system will ensure 'that our military can use it as they need it and deny it to adversaries'.2 GOSSRA researched[277] developing a Soldier System Reference Architecture ready for standardisation, covering and integrating electronics, voice and data communication, human interface devices, sensors, and other functions.

Regarding maritime projects, OCEAN2020 involves 42 partners from 36 countries and has developed integrated system concepts to implement large-scale technology demonstrations[278] for enhanced situational awareness in maritime scenarios. The project has been well documented, having produced several live demonstrations and tests.[279] OPTIMISE[280] is also working on integrating different PNT technologies to achieve a novel navigation architecture, and designing new systems to fuse data from different sensors. The DECISMAR project is developing a decision-support toolbox as a cyber-secured and future-proofed integrated IT environment to support 'the upgrade of maritime surveillance under the scope of both current and future defined High-Level Operational Requirements (HLORs)'.[281]

PANDORA[282] and SEA Defence[283] projects aim to improve warship security. While SEA Defence will produce a feasibility study of lower detectability of naval platforms with specific recommendations, PANDORA is more focused on military sensor network security, real-time cyber-threat detection and response, and shared intelligence on cyber threats. Both projects are related to the EU objective of designing the next generation of naval ships and platforms.

Finally, the EUDAAS project[284] is unique in that its goal is to design and implement a Detect And Avoid system (DAA) to ensure that unmanned and remotely operated aircraft will not collide with other aircraft. The project plans to integrate its solution into the European civil air traffic management system.

Projects delivering forecast and decision-support tools

PYTHIA, SOLOMON, DECISMAR and ESC2 (see previous section on DECISMAR)

PYTHIA[285] and SOLOMON[286] focus on methodologies for improving civil and strategic defence technology foresight,[287] and also to anticipate technology-related matters to manage changing strategies that could affect military supplies, and reduce risks to the supply of EU armament systems. The projects 'intend to merge the two complementary visions of grand [EU] strategy (as it emerges from EU geo/political/economic postures) and [companies'] business strategy (as it emerges from the Michael Porter's value chain theory)[288] in order to outline the possible roadmaps for tackling the supply risk of the EU armament systems', to ensure that 'the industries responsible for the delivery of the EU armament systems and services could rely on a trusted supply and that in turn EU, as a whole, could overcome the issues related to critical defence technological dependencies'. The goal is therefore both to address industry needs and EU supply risks.[289]

ESC2 will develop 'the advanced European Strategic Command and Control (C2) system, which will contribute to the achievement of the EU new level of ambition'.

Project preparing a future European interoperability standard for military unmanned systems

This category includes the INTERACT project, whose objective[290] is to create a basis for a future European interoperability standard for military unmanned systems, and is independent of national and industry regulations.

Projects focusing on basic tools and system demonstrations

There is little public information on the EDIDP projects DECISMAR, DRONEDGE-E, ECYSAP and ESC2.[291] According to the EU resolution,12 ECYSAP will 'develop and implement innovative theoretical foundations, methods, research prototypes' and will integrate them to provide a 'European operational platform for enabling real-time Cyber Situational Awareness with rapid response defensive capabilities and decision-making support for military end-users', while ESC2 will develop 'the advanced European Strategic Command and Control (C2) system, which will contribute to the achievement of the EU new level of ambition' , including a feasibility study and a system design; the C2 system will be 'fully interoperable with the Command and Control structures'. Finally, and also according to the EU resolution,12 DRONEDGE-E is a small project that will produce a study on how to transfer an existing 3D swarm simulator to the real world, to be used on existing fixed-wing drones.

In short, the DECISMAR, ECYSAP, ESC2 projects are creating infrastructures for the EU defence programme by implementing parts of several PESCO projects, whereas the DRONEDGE-E is a limited simulation study.[292]

Regarding the specific planned activities, SEA Defence and DRONEDGE-E focus on feasibility and simulation studies including recommendations. ESC2 considers the study and design of a fully interoperable C2 system, while the other EDIDP projects (DECISMAR, ECYSAP, EUDAAS and PANDORA) cover the usual phases of study, design, prototyping and testing.

EUDAAS and PANDORA will be integrated and tested on pre-operational scenarios: The EUDAAS Detect and Avoid system will be tested on the Medium-Altitude Long-Endurance RPAS (EuroMALE test platform) and other as the Tactical Unmanned Aerial Vehicles, while PANDORA solutions will be demonstrated in two practical cases: warship security and military sensor network security.

Table 3 above also shows that all EDIDP 2019 projects except DRONEDGE-E and SEA Defence are implementing specific PESCO projects.[293]

The PADR projects CROWN and GOSSRA and EDIDP projects ECYSAP, ESC2 and PANDORA are also discussed in the next section, as they also involve the development of specific technologies.

TECHNICAL ANALYSIS OF THE PROJECTS INVOLVING SPECIFIC TECHNOLOGIES

Here, we look at the 13 PADR projects and 12 EDIDP projects in relation to specific technologies. Two of the PADR projects (CROWN and GOSSRA) and three of the EDIDP ones (ECYSAP, ESC2 and PANDORA) were also discussed in the last section.

Regarding PADR projects, Table 5 shows the main keywords of each project, whether they include a demonstration of the final system, or the design and/or development of disruptive combat systems, and whether they are part of future technological developments. In the case of EDIDP projects, it also includes the planned activities (this information is not available for PADR projects) and their connection with PESCO projects. The technologies involved will be addressed in the relevant section.

Table 5. Projects involving specific technologies

5a) PADR projects				
Acronym	Keywords	System Demonstration	Disruptive Combat System	Future Technological Development
ACAMSII	Protection_Syst, Soldier_Syst, Soldier_Garn			
AIDED	Counter_Mine, Zone_Mapping,, Protection_Syst, Unmanned_Syst			
ARTUS	Counter_Mine, Zone_Mapping, Protection_Syst, Unmanned_Syst	Yes		
CROWN	Integration, Electron_Cyber, Signal_Proc, Electronic_Radar			
EXCEED	Electron_Cyber, UAV_Comm, Electronic_Radar, Sensor_Fussion			
GOSSRA	Integration, Soldier_Syst, Signal_Proc, Sensor_Fussion			
METAMASK	Protection_Syst, Soldier_Syst, Soldier_Garn, Electronic_Radar	Yes		
PILUM	Disrupt_Guns, Autom_Control		Yes	Yes
PRIVILEGE	Secured_Comm, Signal_Proc, Artificial_Intellig			
QUANTAQUEST	Secured_Comm, Signal_Proc, Navigation_Syst			Yes
SPINAR	Electronic_Radar, Signal_Proc, Artificial_Intellig			
TALOS	Disrupt_Guns, Target_Location, Counter_UAV	Yes	Yes	Yes
VESTLIFE	Soldier_Syst, Soldier_Garn, CBRN			

5b) EDIDP 2019 projects					
Acronym	**Keywords**	**Activities**	**PESCO Project?**	**System Demonstration**	**Disruptive Combat System**
ECYSAP	Electron_Cyber, Cyber_Security, Electronic_Radar	Study, Design, Prototype, Testing	Yes		
ESC2	Command_Control, Forecast, Secured_Comm	Study, Design	Yes		
FITS4TOP	Simulation, VR_Training	Study, Design, Prototype, Testing, Qualification			
GEODE	Positioning, Navigation_Syst, Unmanned_Syst	Study, Design, Prototype, Testing, Qualification	Yes	Yes	
iMUGS	Unmanned_Syst, Manned_Unmanned, Secured_Comm, Autom_Control	Study, Design, Prototype, Testing	Yes	Yes	Yes
LOTUS	Unmanned_Syst, Low_Obs_UAV, Artificial_Intellig, Feature_Recog, Sea_Surveillance, Signal_Proc	Study, Design, Prototype, Testing		Yes	
LynkEUs	Integration, Unmanned_Syst, Target_Location	Study, Testing	Yes	Yes	
OPTISSE	Earth_Obs, Image_Proc, Signal_Proc	Design			
PANDORA	Integration, Sea_Security, Electron_Cyber	Study, Design, Prototype, Testing	Yes	Yes	
PEONEER	Integration, Earth_Obs, Feature_Recog, Artificial_Intellig, Sensor_Fusion	Study, Design, Prototype, Testing			
REACT	Unmanned_Syst, Electronic_Radar, Electron_Cyber	Study, Design	Yes		Yes
SMOTANET	Mobile_Networks, Secured_Comm	Study			

The projects listed in Table 5 are briefly discussed below.

Disruptive defence and protection projects

The ACAMSII[294] PADR project goal is to integrate active and passive adaptation mechanisms into textile-based dynamic camouflage materials, to achieve an 'increase in survivability'. Similarly, VESTLIFE[295] seeks to develop advanced bulletproof garments that integrate CBRN detection systems, to create materials that optimise physical weight and protection. METAMASK[296] will design and develop meta-materials for electromagnetic camouflage of military equipment using adaptive and active meta-surfaces. The project will also develop an experimental demonstrator of a new technology for radar camouflage.

Projects including non-disruptive tools for defence and combat

EXCEED is a hardware-directed project[297] to design and develop multi-function chips that will be reconfigurable and flexible, and able to include radar sensors, signal-processing tools, secure positioning and navigation, UAV data links and military networks. It is not known where the chips will be placed.

GOSSRA, also discussed in the Basic Tools Section,3 will integrate electronics, human interface devices, sensors, voice and data communication etc. to design a new soldier system architecture.

Disruptive combat systems projects

The PILUM project[298] investigates the use of electromagnetic rail-guns for long-range future artillery systems, using electromagnetic acceleration rather than chemical propellants, and plans to achieve a full-scale demonstrator by 2028.

TALOS[299] is designing and creating a roadmap to develop critical laser-effector technologies, a disruptive and future combat technology to be integrated in military applications in the next decade. The research includes precision target tracking, laser-pointing systems that lock the laser beam on the target, and the design and demonstration of parts of the high-power laser weapon. Potential uses include counter-UAV systems.

LinkEUs[300] includes the integration of a land-missile system, a UAV-based target designation and cyber-secured target location, and a land platform. The project includes a demonstration through a full-scale firing campaign beyond the line of sight.

Projects including disruptive tools for defence and combat

AIDED and ARTUS[301] focus on the use of intelligent swarms of unmanned ground vehicles to identify conventional and unconventional explosives, e.g. buried mines. The AIDED project will use autonomous mission planning and positioning/mapping techniques to identify explosives and propose safe passages. According to the project goals, the swarm will also be able to carry wounded personnel. The ARTUS swarm will provide an increased payload capability through hard and severe environments, including densely wooded or sloped areas; reacting autonomously to unexpected developments, such a partial loss of the swarm. The ARTUS project workplan includes a demonstrator.

The CROWN project, partly discussed in the Basic Tools Section,2 plans to integrate radar, electronic warfare and communication tools in a single system.

PRIVILEGE[302] seeks to investigate new encryption technologies for confidential military and defensive data throughout the life-cycle of AI data, with a focus on learning. Related to it, QUANTAQUEST[303] will investigate future quantum-based technologies including quantum sensing for navigation, quantum communication, and quantum computer cryptanalysis. These are small projects (€1.5 million and €1.4 million respectively) that could be considered as prospects for potential future military technologies.

Regarding EDIDP projects, ECYSAP and ESC2 were discussed in the Basic Tools Section.12 ECYSAP includes the development of a real-time defensive system capable of cyber response, while ESC2 will participate in the development of the advanced PESCO European Strategic Command and Control (ESC2) system.

FITS4TOP[304] aims to provide a European training system for military pilots that will integrate different operational scenarios involving air (combat jets), ground and maritime forces.

GEODE[305] includes the design, prototyping, testing and qualification of multiple Galileo PRS-enabled Positioning, Navigation and Timing (PNT) navigation solutions for European defence-specific requirements. The project includes military operational field-testing and demos.

The iMUGS project will design a scalable and flexible architecture for hybrid manned and unmanned systems including aerial and ground platforms. Testing will be based on 'an existing unmanned ground vehicle and a specific list of payloads'.[306]

LOTUS[307] deals with low-observable tactical unmanned air surveillance systems, including advanced autonomy functions, processing algorithms, and a conjunction of a 'mother' UAV with 'son' tube-launched, foldable-wing drones. The objective is surveillance of borders and migration flows. The project includes the design and testing of the proposed UAV.

The OPTIMISSE project[308] aims at studying and designing a very high-resolution multi-spectral miniaturised optical camera for small satellites, including feature tracking and high-rate data transmission. PEONEER[309] will provide geo-intelligence analysts with an AI-based software platform to discover relevant patterns and determine and identify changes and motion, both in sea and land scenarios.

PANDORA was partly discussed in the Basic Tools Section.16 It includes the development and testing of tools for military sensor network security with shared intelligence on cyber threats, like real-time cyber threat hunting and incident response.

The REACT project focuses on electromagnetic spectrum of operations, providing the EU with a design for Air Electronic Attack Capability, as an on-board tool for manned and unmanned combat aerial vehicles. Disrupting systems including low-frequency radars response and escort-jamming PODs[310] will be designed and tested in the framework of the project.

The SPINAR project[311] objective is the hardware implementation of artificial neural networks, using spin-based nano-devices as neurons. The resulting chip will be highly efficient with low-power computation.

Finally, SMOTANET[312] plans to design and develop an innovative network of tactical communications that modular, adaptive and secure and use mobile ad hoc networks with software-defined networking.

Most of the EDIDP 2019 projects include study, design, prototyping and testing. Exceptions are ESC2 and REACT (no prototyping and testing), LynkEUs (testing of an integrated system), OPTIMISSE (only design), and SMOTANET (only research). This information is not available for PADR projects.

As already mentioned, Table 5 also shows that most EDIDP 2019 projects (ECYSAP, ESC2, GEODE, iMUGS, LinkEUs, PANDORA, REACT) are implementing specific PESCO projects.[313]

PROJECTS AND DISSEMINATION

A basic analysis of public dissemination was undertaken for each project. Figure 1 shows the results of searching for each project name and 'EDA project' in Google. The search was performed on 9 August 2021.
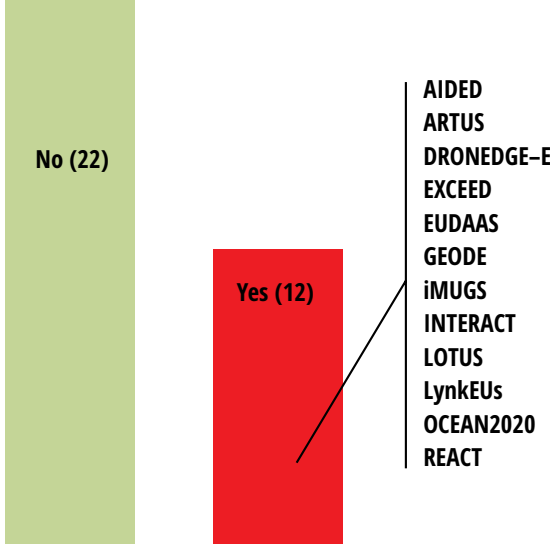
Figure 1. Dissemination
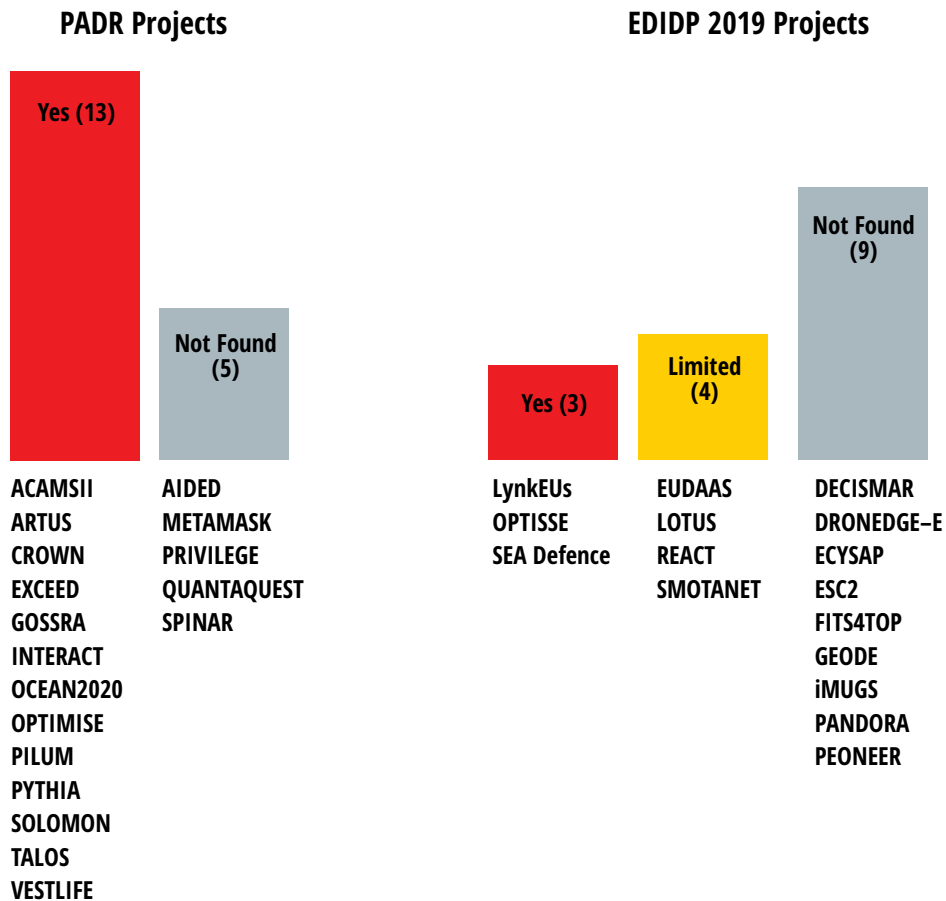
Source: Own elaboration, based on Google search of the project name (date: August 9, 2021)

PADR projects show more dissemination activities than EDIDP 2019 projects, perhaps because most of the latter have suffered delays (partly due to the COVID-19 pandemic) and they are just starting or have yet to do so. The bar 'Limited' in EDIDP projects includes four projects in which some partners have prepared press releases with public (not technical) information.

TECHNOLOGIES ADDRESSED IN PADR AND EDIDP PROJECTS

The development/use of unmanned systems are included in only 12 projects (see Figure 2).

Figure 2. Use of unmanned systems

No (22)

Yes (12)

AIDED
ARTUS
DRONEDGE–E
EXCEED
EUDAAS
GEODE
iMUGS
INTERACT
LOTUS
LynkEUs
OCEAN2020
REACT

The use of AI in the projects is not as widespread as might have been expected but it is still of concern that it is being funded taking in to account the points raised in the previous chapter.

Figure 3. Use of AI techniques

No (23)

ARTUS
OCEAN2020
DECISMAR
ECYSAP
ESC2

Unclear (5)

AIDED
iMUGS
LOTUS
PEONEER
PRIVILEGE
SPINAR

Yes (6)
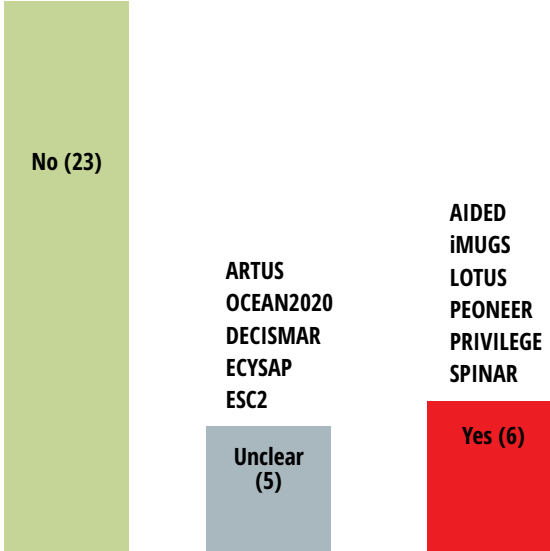
Twenty-three projects do not use AI, while six are using it as a disruptive tool (see Figure 4). The remaining five projects (ARTUS, OCEAN2020, DECISMAR, ECYSAP and ESC2) are unclear, according to our analysis and the available documentation. We do not include INTERACT in this list, because its main goal is to define a future EU cross-industry interoperability standard for unmanned systems. Although this standard 'will allow unmanned assets to be deployed flexibly ... in manned-unmanned teaming or as autonomous swarms', we understand that the application to autonomous swarms is deferred to future projects.

Figure 4. Global characterisation of project activities and keywords, including disruptive technologies
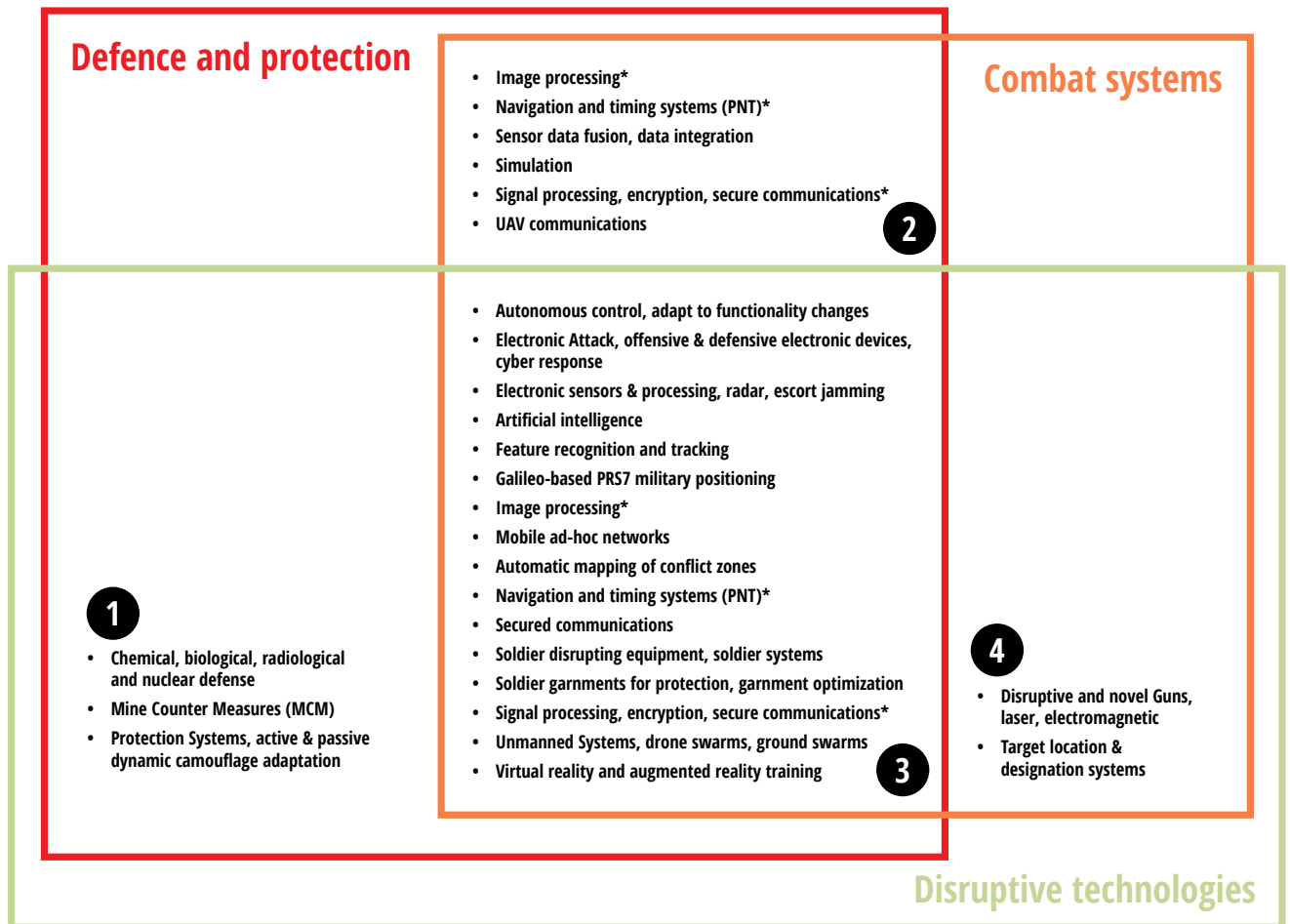
1. Disruptive defence and protection projects: METAMASK, VESTLIFE

2. Projects including non-disruptive tools for defence and combat: EXCEED, GOSSRA, OCEAN2020

3. Projects including disruptive tools for defence and combat: ACAMSII, AIDED, ARTUS, CROWN, DRONEDGE-E, ECYSAP, EXCEED, FITS4TOP, GEODE, GOSSRA, iMUGS, INTERACT, LOTUS, OPTIMISE, OPTISSE, PANDORA, PEONEER, PRIVILEGE, QUANTAQUEST, REACT, SMOTANET, SPINAR

4. Disruptive combat systems projects: PILUM, TALOS. LynkEUs

Projects not included in this Table: DECISMAR, ESC2, EUDAAS, PYTHIA, SOLOMON, SEA Defence

Image processing, navigation ans timing systems, signal processing and encryption and secure communications systems can be either disruptive or not

The two top boxes (green and orange) group the keywords related to defence and protection systems (green) and those related to combat/attack systems (orange). Most keywords lie in the intersection of both boxes, meaning that they are hybrid technologies that can be used in defence or attack. Vertically, Figure 4 groups the technical keywords into classical technologies (top) and disruptive technologies (bottom). Both technical keywords and projects can be characterised as:

- Defence and protection disruptive technologies
- Hybrid non- disruptive technologies
- Hybrid disruptive technologies
- Disruptive combat systems

METAMASK and VESTLIFE deal with disruptive defence and protection technologies (category 1). The EXCEED, GOSSRA, and OCEAN2020 (category 2) projects include non-disruptive tools that could be used in defence or in combat scenarios, while the three projects in category 4 (PILUM, TALOS, LynkEUs) seek to develop novel and disruptive combat systems. The majority of projects fall into

category 3, developing disruptive tools which in the future could be used in defence or in combat: ACAMSII, AIDED, ARTUS, CROWN, DRONEDGE-E, ECYSAP, EXCEED, FITS4TOP, GEODE, GOSSRA, iMUGS, INTERACT, LOTUS, OPTIMISE, OPTISSE, PANDORA, PEONEER, PRIVILEGE, QUANTAQUEST, REACT, SMOTANET, and SPINAR. We understand that EXCEED and GOSSRA are developing non-disruptive and disruptive technologies. In total, 25 out of 34 projects are developing hybrid basic technologies usable both in defence and combat.

Figure 4 does not include six projects (DECISMAR, ESC2, EUDAAS, PYTHIA, SOLOMON, SEA Defence) because they focus more on analysis, feasibility studies and forecasting than on technology.

CONTROVERSIAL SYSTEMS, RISKS INVOLVED, AND CONCLUSIONS

Although most of the keywords and projects (categories 1, 3 and 4) can be considered disruptive, the great majority (categories 2 and 3) are hybrid, with potential use both in defence and in combat/attack. The most controversial and risky category (4) includes three projects (PILUM, TALOS, LinkEUs).

The deployment of unmanned systems using AI technologies poses obvious risks and these projects are controversial (AIDED, iMUGS, LOTUS) as we will see in the final chapter. The same could also apply to the six projects involving the use of AI plus the five AI-unclear projects. But the current information is still too vague, and it will be necessary to wait until the projects materialise before final conclusions can be drawn on the precise risks that these particular projects pose. A worrying aspect is that in EDIDP projects, the EU has not envisaged making ethical checks as we explain in the next chapter. Civil society organisations (CSOs) will have an essential role in demanding transparency.

All EDF projects should be considered controversial in view of the EU's founding principles and values – inclusion, tolerance, justice, solidarity, non-discrimination, the promotion of peace, the inviolability of human dignity, and the defence of human rights.[314] EDF projects, once operational, could potentially breach both these EU values and international humanitarian law (IHL), enhancing militarised national security systems, and turning a blind eye to human-centred safety, a non-militarised notion of security, and the idea of negotiated resolution of conflict rather than military engagement.

Indeed, some of the PADR and EDIDP projects are particularly controversial, and here follows some conclusions on the degree of controversy and risk attached to the PADR and EDIDP project technologies:

- Novel guns based on laser and electromagnetic systems are particularly problematic. They are fast, silent and (in some cases) invisible. They show significant potential to be used to commit human rights abuses and to attack civilians. These weapons should be subject to strict scrutiny by recognised independent non-military experts and by ethics committees.

- AI can become controversial and certainly risky if used in critical military systems, because there are no zero-risk AI systems, and, in critical combat systems, errors imply casualties, often civilian. AI systems should be subject to strict scrutiny by recognised independent non-military experts and by ethics committees. This scrutiny should focus on tactic-loitering drones and drone swarms, as they are clear candidates to become autonomous weapons that operate without human control. Moreover, controlling a swarm erodes operators' sense of moral responsibility and at the same time may unfairly make the operators accountable for the outcome[315] since they are highly cognitively demanding and subject to potential communication disruptions.

- Electronic devices and cyber response can become controversial when used in combat systems, because offensive electronic devices and jamming systems can indirectly lead to civilian casualties.

- The development of unmanned systems, drone and ground swarms, should be closely inspected by recognised independent non-military experts and by ethics committees. Specific combat unmanned systems are fairly similar to the autonomous weapons, whereas surveillance-oriented unmanned systems can easily disregard human rights and privacy for illegal purposes.

- Non-autonomous remote-controlled combat drones are controversial. Expert studies conclude that in general there is a lower threshold for 'killing at a distance' (from a computer room) than directly on the battlefield. Activists such as Medea Benjamin consider that[316] when military operations are conducted through the filter of a distant video camera, there is no possibility of visual contact with the enemy, whereby the perception of damage from the possible attack on human beings decreases. Markus Wagner explains that disconnection and distance create an environment in which it is easier to commit atrocities. Likewise, Alex Leveringhaus says that the intentional or involuntary use of distance to obscure responsibility in situations of armed conflict indicates a deep lack of respect for human rights and by extension the moral dignity of people since all human beings deserve equal consideration and respect. There are also problems associated with the so-called 'automation bias,[317] meaning that remote operators are predisposed to accept computer recommendations without seeking any other confirmation.

- Target location, tracking and designation systems, together with feature-recognition technologies, even if supervised by human operators, can become controversial because of the automation bias[318] and related phenomena.

Given the proportion of projects devoted to 'basic tools', forecast and integration (more than a third of the total) and given the high number of projects in the hybrid disruptive technologies category (22 projects out of 34) that will be able to be deployed in more specific projects in the future, we can infer that these PADR and EDIDP projects are probably just preparing ground for projects that will be more focused on specific EU military objectives.

The above analysis leads to a conjecture: some companies may consider EDF Calls as a complementary funding option, rather than an opportunity to cooperate on common objectives. They may also lobby to get 'their' topics in the Calls, and then propose projects on these topics, with little interest in developing novel disruptive systems.[319]

Moreover, EDIDP may not be fully successful (in future Calls) in the proposed sharing of military industrial technologies. Cutting-edge technologies are corporate assets, and companies may be reluctant to divulge these to other parties or make them public until they have secured profits. As mentioned in relation to the PYTHIA project, companies consider that the goal is to 'merge the two complementary visions of [EU]grand strategy... and [private companies'] business strategy'. Military industries represent very powerful private interests, and they may be willing to drive and influence the whole EDF programme. This would be incompatible with EU principles and founding values, and it is therefore inconceivable that public EU funds are being channelled to private industries that will boost their profits while developing disrupting technologies for defence and attack, preparing new weapons that will be sold to many non-EU countries where they may be used to kill civilians while those producing them are unaffected. It is illogical for the EU both to claim to defend human dignity and rights and also to develop and export new weapons systems that will likely do the exact opposite. Finally, the profit driven nature of these projects means that they push companies towards developing weaponry, often in competition rather than in cooperation with each other, which will ultimately drive a new type of arms race.

'SMART' WEAPONS

The legal and ethical implications of developing new kinds of weaponry with European funds

By Joaquín Rodriguez Alvarez

As this report has shown, EU defence funding has hugely increased in recent years. This is driving a new kind of arms race defined by the rise of weapons systems that encompass Artificial Intelligence (AI), bio-metrics and other advanced technological developments. Dystopian scenarios that were until recently the stuff of science fiction have become a reality. Arms companies are designing and programming lethal weapons that once operational, will be reliant on 'smart' technologies. These weapons may eventually perpetrate violent attacks without meaningful human intervention. Some define this as the third evolution of warfare, the first being the invention of gunpowder, followed by nuclear weapons, each profoundly changing the conduct of war.[320] Our legal systems were developed to address situations occurring in the real world, not in virtual spaces, and have so far failed to tackle the implications of advances in the use of 'smart' weaponry. This chapter focuses on the development of EU funded autonomous weapons and the legal and ethical considerations regarding their use in war and armed conflict.

THE LEGAL ISSUES

Legal frameworks

The EU has no specific legal framework to regulate the militarisation of technology. Originally, the EU was envisaged as a promotor of peace and not as a military alliance, and its founding principles did not foresee the bloc becoming a military power. Indeed, Article 3 of the Treaty of the European Union states that *the Union's aim is to promote peace, its values and the well-being of its peoples'*.[321] Much has changed since 1992 when the treaty was signed and, as this report shows, the EU is now increasingly intent on investing in militarism rather than in building or maintaining peace.

There is a lack of political will on the part of European leaders to genuinely understand the implications and address concerns regarding the technological advances that are bankrolled by the EU. Although this may be true of Europe's general approach to digitalisation, in the case of technology and the military–industrial complex, the consequences of turning a blind eye to these developments could potentially be catastrophic. In September 2018, the European Parliament adopted a text that called on the Vice-President of the Commission/High Representative for Foreign Affairs and Security Policy, the Member States and the European Council to 'develop and adopt, as a matter of urgency … a common position on lethal autonomous weapons systems that ensures meaningful human control over critical functions of weapons systems, … to work towards the start of international negotiations on a legally binding instrument prohibiting lethal autonomous weapons'.[322] In January 2021, the European Parliament issued a press statement in which it noted that 'the use of lethal autonomous weapon systems (LAWS) raises fundamental ethical and legal questions on human control' and called 'for an EU strategy to prohibit them as well as a ban on so-called "killer robots"'.[323] This call fell on deaf ears. The Artificial Intelligence Act proposed in April 2021 makes clear that 'this Regulation shall not apply to AI systems developed or used exclusively for military purposes'.[324] In the absence of legal codes designed specifically to address the use of AI-programmed weapons systems, we examine how International Humanitarian Law (IHL) may be applied to bridge this gap.

International Humanitarian Law and AI

The Geneva Conventions of 1949 and the Additional Protocols of 1977 govern the laws of war and armed conflict. Although the EU is not party to the Geneva Conventions, the International Court of Justice (ICJ) recognises the *corpus juris* (body of law) as '*intransgressible principles of international customary law*' and it is therefore bound by it. These conventions are strengthened by various conventions applicable to specific weapons systems, the most recent of which was the ban on nuclear weapons adopted by the United Nations General Assembly in 2017, but which states in possession of nuclear weapons have largely ignored to date.[325]

Article 36 of Additional Protocol I to the Geneva Conventions states that 'in the study, development, and acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law'.[326] The question therefore is whether the EU has determined whether 'smart' weapons systems funded through PADR and EDIDP may violate the principles of International Humanitarian Law (IHL). To answer this, we looked at how the funding proposals were reviewed and approved for PADR and EDIDP funding, although our findings show that the approval process obscures more than it reveals. In the case of Belgium,[327] Sweden[328] and the Netherlands,[329] for example, there are entities, however effective they may be in practice, that are tasked with reviewing arms projects. At EU level, conversely, there is no such body, meaning that the EU follows lower standards than some of its member states on the particularly sensitive matter of weapons development. There is what appears to be a deliberate gap in publicly available information regarding the procedures for approving EU funding for R&D on weapons and related systems. This makes it difficult to ascertain whether the EU has applied rigorous legal and ethical reviews before approving a project or whether the approval procedure is merely a box-ticking exercise. From what we could glean from the information available, it does not appear that the EU has in place adequate procedures to block funding for controversial weaponry, and as we have already discussed, companies embroiled in corruption allegations and producers of nuclear weapons are among the largest recipients of EU funding, an indication of just how low the bar is in terms of approval standards.

In January 2006, the International Committee of the Red Cross (ICRC) published *A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977*.[330] This outlines three steps central to any review process:

1. *Determine whether employment of the particular weapon or means of warfare under review is prohibited or restricted by a treaty which binds the reviewing State or by customary international law.*

2. *Determine whether employment of the weapon or means of warfare under review and the normal or expected methods by which it is to be used would comply with the general rules applicable to all weapons, means and methods of warfare found in Additional Protocol I and other treaties that bind the reviewing State or in customary international law.*

3. *In the absence of relevant treaty or customary rules, the reviewing authority should consider the proposed weapon in light of the principles of humanity and the dictates of public conscience.*

With regard to the first step, there is currently no international treaty prohibiting the kinds of new technologies being funded under PADR and EDIDP. The second step requires that a review must take into account not just the weapon but how it will be used. In practice this may be understood to require consideration of a wide range of military, technical, health, and environmental factors. The third step relies on the Martens Clause, which, although dating from the 1899 Preamble to The Hague Convention II Laws and Customs of War on Land, is an important element of customary international law. It states that:

Until a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between civilized nations, from the laws of humanity and the requirements of the public conscience.[331]

In the words of the ICRC, 'the effect of the clause is to underline that in cases not covered by IHL treaties, persons affected by armed conflicts will never find themselves completely deprived of protection',[332] so the fact that something is not explicitly prohibited by a treaty does not automatically mean that it is permitted.[333] Therefore, even when there are gaps in a specific legal framework, the laws of humanity and the dictates of public conscience must be considered.

How do the Martens Clause and the ICRC Guide apply to PADR and EDIDP?

Applicants to PADR must conduct an Ethical Legal and Societal Aspects (ELSA) self-assessment as part of the submission process, for which the European Commission provides guidelines.[334] In other words, the responsibilities conferred on state parties under IHL are derogated to private, third-party funding applicants in the form of self assessments.

In 2020, the Belgium-based non-government organisation (NGO) Vredesactie requested access to documents containing information about the ELSA reviews conducted by applicants for PADR funding.[335] In response, a letter from the European Defence Agency stated that '*… we have come to the conclusion that they may be only partially disclosed. Some parts of the documents have been blanked out as their disclosure is prevented by exceptions to the right of access laid down in Article 4 of this Regulation …*'.[336]

The EDA also attached 24 documents as part of its response, most of which were redacted, but it was, nonetheless, possible to establish the following conclusions:

None of the documents contained anything related to legal reviews, but did contain ethical considerations, which will be discussed in the next section.

Although the ELSA procedure includes a panel of experts who are tasked with performing 'a remote individual assessment'[337] of each proposal, it was not possible to identify who the rapporteurs or reviewers were, whether there may have been potential conflicts of interest, or whether they had the relevant skills to participate in such an expert panel. It was not possible to see who participated in review meetings, what data was shared or discussed, what methodologies were used or how a final assessment and conclusion was researched.

ETHICS ASSESSMENT

CONSENSUS REPORT (CR)

Programme: *Preparatory Action on Defence Research (PADR)*
Call for proposals: Strategic Technology Foresight (PADR-STF-2017)
Topic: PADR-STF-1-2017 – The European Defence Research Runway
Type of action: Coordination and Support Action (CSA)
Call deadline: 28.09.2017

Proposal:

Date of ethics assessment: between 30.10.2017 and 03.11.2017

Ethics reviewers:

Names (and role, if other than evaluator)		
Name SURNAME	Role	Signature
	ELSA Expert	
	ELSA Expert	
	ELSA Expert	

Proposal data:

Duration (months): 18

Applicants:

Project abstract:

ETHICS ASSESSMENT

CONSENSUS REPORT (CR)

Programme: *Preparatory Action on Defence Research (PADR)*
Call for proposals: Strategic Technology Foresight (PADR-STF-2017)
Topic: PADR-STF-1-2017 – The European Defence Research Runway
Type of action: Coordination and Support Action (CSA)
Call deadline: 28.09.2017

Proposal:

Date of ethics assessment: between 30.10.2017 and 03.11.2017

Ethics reviewers:

Names (and role, if other than evaluator)		
Name SURNAME	Role	Signature
	ELSA Expert	
	ELSA Expert	
	ELSA Expert	

Proposal data:

Duration (months): 18

Applicants:

Project abstract:

ETHICS ASSESSMENT

CONSENSUS REPORT (CR)

Programme: *Preparatory Action on Defence Research (PADR)*
Call for proposals: Force protection and advanced soldier systems (PADR-FPSS-2017)
Topic: PADR-FPSS-01-2017
Type of action: Research and Innovation Action (RA)
Call deadline: 28.09.2017

Proposal:

Date of ethics assessment: between 10.01.2018 and 11.01.2018

Ethics reviewers:

Names (and role, if other than evaluator) [1]		
Name SURNAME	Role	Signature
	ELSA Expert	
	ELSA Expert	
	ELSA Expert	

Proposal data:

Duration (months): 36

Applicants:

Project abstract:

[1] Format: First name LASTNAME.

ETHICS CR/SR

⚠ Use this template for PADR ethics CRs/SRs for the ethics assessment.
⚠ One report per proposal.

➢ Instructions and footnotes in blue will have to be deleted in the final versions of the Ethics CR/SR.
➢ For options [in square brackets] the option that applies must be must be kept, and the others deleted.
➢ For fields in [grey in square brackets] enter the appropriate data between the brackets.

ETHICS ASSESSMENT

[CONSENSUS REPORT (CR)][SUMMARY REPORT (SR)]

Programme: *PADR*
Call for proposals: [insert title: PADR – text] ([insert call identifier: PADR-xxxx-20XX])
Topic: [insert short name of topic] – [insert long name of topic]
Type of action: [insert type of action]
Call deadline: [insert deadline: dd.mm.yyyy]

Proposal: [insert proposal ID] – [acronym]

Date of ethics assessment: between [dd.mm.yyyy] and [dd.mm.yyyy]

Ethics reviewers:

Names (and role, if other than evaluator) [1]		
Name SURNAME	Role	Signature

Proposal data:

Duration (months): [insert number of months]

Applicants: [insert table with list of applicants, their costs and the requested grant amount]

Project abstract: [insert project abstract]

[1] Format: First name LASTNAME.

1

According to EDIDP Regulation and Commissioner Breton,[338] there have been no ELSA reviews for these projects, which clearly violates IHL stipulations with regard to new types of weapons systems. On 24 June 2020, Vredesactie received a response from Timo Pesonen,[339] the Director-General for Defence Industry and Space, in relation to its request for access to the assessment criteria. The letter stated that '*disclosure of the documents "related to the reviewing of EDIDP projects' compliance with international law" would undermine the protection of the commercial interests of the economic operators participating in the EDIDP calls for proposals'.* The letter further stated that '*the European Commission does not possess any dedicated documents that would focus on this particular aspect and contain its detailed, substantive assessment. Indeed, the consortia participating in the European Defence Industrial Development Program are not required to submit such dedicated documents'.* The correspondence ended by clarifying that '*the issue of compliance with international law is covered in the submitted proposals (documents category 1), as the consortia are required to declare that the proposals are indeed compliant with the requirements of international law. The fulfilment of these criteria is checked by the experts and the European Commission on the grounds of the technicalities of each project proposal'.*[340]

Vredesactie subsequently lodged a complaint with the European Ombudsman regarding how the EC dealt with a request for public access to documents concerning the EDIDP.[341] The Ombudsman's investigation found that 'the documents contain only very limited information on the compliance of the proposals with international law – the documents contain only the "yes/no" conclusion on a project's compliance with the international law criterion... The Commission representatives explained to the Ombudsman's inquiry team that whenever a positive evaluation, no further details were recorded explaining why this conclusion was drawn'. The Ombudsman's office concluded that 'The fact that there is no detailed assessment of the compliance of projects with international law is thus a cause for some concern'.[342]

Our analysis of the case taken by Vredesactie to the European Ombudsman, and our review of documents made available through the Ask the EU facility, show that although the projects funded under PADR and EDIDP may lead to the creation of new military wares and the development of highly controversial lethal weapons, the EU has failed to ensure that even the very minimum legal standards set out under IHL are upheld. More accurately, the assessments are effectively a box-ticking exercise. This begs the question, with millions of euros at stake, and a system based on self-assessment, how likely are applicants to make a self-assessment that they do not meet the legal threshold and make this clear in their application proposal? The procedures are based on blind faith rather than meeting any stringent, independently verifiable criteria, and there is almost no transparency or public accountability. To all intents and purposes, it signifies a deregulation of potentially one of the deadliest pools of money managed by Brussels. The EU claims to uphold the rule of law, however in relation to defence budgets it appears to fall significantly short of even the most basic legal standards.

Table 1. Banned Weapons

Here follows a table of banned weapons, as well as the Treaty under which their use was outlawed. This is relevant in contextualising how controversial weapons have been banned in the past and may provide useful precedent relevant for civil society groups advocating a ban on autonomous weapons.

Weapon	Treaty
Explosive projectiles weighing less than 400 grams	• Declaration of Saint Petersburg (1868)
Bullets that expand or flatten in the human body	• Hague Declaration (1899)
Poison and poisoned weapons	• Hague Regulations (1907)
Chemical weapons	• Geneva Protocol (1925) • Convention on the Prohibition of Chemical Weapons (1993)
Biological weapons	• Geneva Protocol (1925) • Convention on the Prohibition of Biological Weapons (1972)
Weapons that injure by fragments which, in the human body, escape detection by X-rays	• Protocol I (1980) to the Convention on Certain Conventional Weapons
Incendiary weapons	• Protocol III (1980) to the Convention on Certain Conventional Weapons
Blinding laser weapons	• Protocol IV (1995) to the Convention on Certain Conventional Weapons
Mines, booby traps and "other devices"	• Protocol II, as amended (1996), to the Convention on Certain Conventional Weapons
Anti-personnel mines	• Convention on the Prohibition of Anti-Personnel Mines (Ottawa Treaty) (1997)
Explosive remnants of war	• Protocol V (2003) to the Convention on Certain Conventional Weapons
Cluster munitions	• Convention on Cluster Munitions (2008)

Source: ICRC[343]

Legal compatibility

As we have seen, the EU procedures to apply for defence funding are highly questionable and raise serious concerns about their compatibility with European and international law.

The **Charter of Fundamental Rights of the European Union**[344] is the cornerstone of European law. It is a legally binding instrument that guides EU policies, including defence. **Article 1** states that 'Human dignity is inviolable. It must be respected and protected'.[345] The underlying principle is that everyone has the right to protection regardless of gender, ethnicity, class, religious identity, or any other characteristic.

As yet, it remains unclear how advanced technology, AI, or similar digital advances will uphold this basic principle. Can an AI-operated weapon recognise the value of human life and human dignity and respond accordingly? Can it respond in a non-discriminatory fashion? If it hits the wrong target, where does the legal responsibility lie? With those who programmed it? Where does legal responsibility lie in the digital world – or is it diluted such that there are no legally applicable standards for automated weapons? These are major legal questions that thus far remain insufficiently answered, although innovative automated technologies continue to be developed. Projects such as PYTHIA, SOLOMON, DECISMAR, ESC2, and INTERACT, as discussed in chapter four, are potentially on a collision course with European law because they include automated assistance or decision-support systems.

Article 8 provides for the protection of personal data and the **General Data Protection Regulation** (GDPR) sets out how European legislation must provide such protection. The GDPR is particularly relevant to developments in AI because this form of intelligence relies precisely on data collection and processing by algorithmic systems. At present it is unclear whether or how AI-based military technology funded under PADR and EDIDP is compliant with GDPR.

The **Precautionary Principle**, which is considered a General Principle of European Law, is also highly relevant. On 15 January 1988, the precautionary principle was defined at a meeting held in Wingspread, Wisconsin, which was subsequently known as the Wingspread Statement. It states that 'When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically'.[346] Under this Principle, the proponents of an activity must furnish evidence that their actions will not cause harm to human health or to the environment. If we are to understand the European Commission as a proponent considering that it funds the weaponry that is being developed, has the EC met the Precautionary Principle stipulations? TALOS and LinkEUs are two funded projects that raise unanswered questions about whether the Precautionary Principle was adequately applied. Similarly, the aforementioned investigations by the Ombudsman's office raise significant concerns about what steps were taken to reduce harm.

Moreover, in the documents we examined, there is no indication that ecological or environmental damage has even been considered. An automated aerial system, depending on what it is programmed to do, may potentially have highly negative impacts on the area in which it is operating.[347] In other words, a principle that articulates some of our most important health and environmental safeguards is jeopardised by corporate lobbies in Brussels that are seeking to establish a new Innovation Principle,[348] which could lead to the deregulation of 'Hi-Tech Sectors' in the name of competitiveness.

International Humanitarian Law

Although many nations and non-state warring parties have circumvented or entirely ignored the rules that govern war and armed conflict, the principles of IHL provide a baseline that state and non-state parties are bound by:

- the principle of humanity (the basic considerations set out in the Martens clause)
- the prohibition on attacking non-combatants
- the principle of a distinction between civilians and combatants, and between civilian objects and military objectives
- the principle of proportionality
- the principle of military necessity from which follows:
    - The prohibition on inflicting unnecessary suffering[349] [350]

War and armed conflict are always highly complex, and even more so are the rules of engagement. However, with the advancement of 'smart' weapons, we may unwittingly already have embarked on a path, which may eventually allow an automated machine to make decisions about what constitutes a legitimate target. Where would a robot stand on interpreting legal precedent and legal code in deciding whether and where to launch a rocket? Who would be responsible if the rocket landed on a protected structure or killed or maimed civilians? Currently, AI is unable to distinguish a dog from a doughnut, or a tank from a tractor[351] – or, tragically, a military mobilisation from a wedding feast. How, then, is it conceivable to design such systems to be used in armed combat? Surely the EU should not proceed with funding the types of projects funded under PADR and EDIDP until these legal issues have been fully addressed.

Because of the deliberate efforts to obscure or withhold information regarding projects funded under PADR and EDIDP, it is impossible to establish precisely how this new technology will contribute to the methods and means employed in combat.

THE ETHICAL DILEMMAS

Technology reflects and amplifies human interests and intent. It is not neutral, but fed with algorithms that human beings create, and is therefore programmed with human prejudice and bias. The question of ethics is central to how technology is designed and functions.

As outlined above, there are significant and perhaps deliberate gaps in the information made publicly available for the projects funded under PADR and EDIDP. Of the 24 files that were shared with Vredesactie following a request for information, five could be identified as Ethics Summary Reports from 2017 and 2018, and 10 as Consensus Reports from the same period. Because they were redacted, it was impossible to glean any further information. The EU's deliberate decision not to disclose information on the legality and ethics of projects funded under its defence budget is hugely worrying, particularly considering that the projects are defence orientated. The nondisclosure of information leads one to wonder why such secrecy might be necessary or whether it should be permitted for publicly funded projects. It is worth recalling the aforementioned concerns of the Ombudsman's Office in this regard.

Ethics reports

Table 2 includes the general categories of ethical issues present in the Ethics Summary Report files provided by EDA. The category 'data protection' was only visible in one document, while in the others it was presumably redacted.

Table 2. Ethical issues relating to research and development

Ethical Issues	Yes	No
Humans Does this research involve human participants?	4	0
Protection of personal data Does this research involve personal data collection and/or processing	5	0
Environmental protection and safety Does this research involve the use of elements that may harm to the environment, to animals, or plants?	4	0
Misuse Does this research have the potential for malevolent/ criminal /terrorist abuse?	4	0
Other ethics issues Are there any other ethics issues that should be taken into consideration?	4	0
Ethics Checks An Ethics Check should be conducted. The Check should verify that adequate measures as mentioned above have been implemented?	4	0

The sub-questions varied across reports but included questions such as:

- Does this research involve the use of elements that may cause harm to humans, including research staff?
- Is it planned to import any material – including personal data – from non-EU countries into the EU?
- Does it involve tracking or observation of participants?
- Does this research involve further processing of previously collected personal data (secondary use)?
- Are they volunteers for social or human sciences research?
- All the answers to the legible questions in the files shared with Vredesactie were affirmative.

Consensus reports

Following the ethical self-assessments, reviewers contracted by the EU prepare a consensus report. There is no available information about who these reviewers are and what their backgrounds or fields of expertise bring to the review process. The consensus reports are based on a template,[352] which would appear to be only slightly broader in scope than the ethics review and likely to miss key information regarding ethical implications. Again, it appears more of a box-ticking exercise, rather than a genuine attempt to identify and deal with potentially damaging aspects of the projects presented.

There are no questions addressing issues related to AI in either the ethical or the consensus report, beyond a general section on data protection – which would not adequately deal with the ethical dimensions of the militarisation of AI or other disruptive technologies.

Table 3 includes sections 4–6 from the 10 "consensus report". Where we can observe that except for one project, the rest required further checks, although they were all given ethical clearance (6), or conditional clearance (4).

Ethical Issue	D1[353]	D2[354]	D3[355]	D4[356]	D5[357]	D6[358]	D7[359]	D8[360]	D9[361]	D10[362]
Section 1: Humans Does this research involve human participants?	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Section 2: Human Cells/Tissues Does this research involve human cells or tissues?	N	N	N	N	N	N	N	N	N	N
Section 3: Personal Data Does this research involve personal data collection and/or processing?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Section 4: Environment & Health and Safety Does this research involve the use of elements that may cause harm to the environment, to animals or plants?	N	N	N	N	N	N	N	N	Y	N
Section 5: Misuse Does this research have the potential for misuse of research results?	N	Y	Y	Y	Y	Y	Y	Y	N	N
Section 6:Other Ethics Issues Are there any other ethics issues that should be taken into consideration?	Y	Y	N	Y	N	N	Y	Y	N	N

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Ethics Opinion	CEC*	CEC	EC**	EC	EC	EC	CEC	EC	EC	CEC
Sensitivity level How would you judge the overall sensitivity of the proposal (i.e. how deeply the ethics aspects of the project should be looked into)?	Normal	Normal	High	High	High	High	High	High	Normal	Normal
Ethics Checks In your opinion, would an ethics check during the project implementation be necessary?	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

*CEC – Conditional Ethics Clearance (i.e. clearance is subject to conditions that must be met before grant signature or become part of the grant agreement)   **EC – Ethical clearance

EU Ethics Guidelines for trustworthy AI

The European Commission set up an independent high-level expert group on AI in order to elaborate an 'Ethics Guideline for trustworthy AI'. The group's conclusions were presented in April 2019 and are ordered under four ethical principles: (i) Respect for human autonomy; (ii) Prevention of harm; (iii) Fairness and (iv) Explicability.[363]

The first principle: Respect for human autonomy, states that 'The allocation of functions between humans and AI systems should follow human-centric design principles and leave meaningful opportunity for human choice.[364] However, the current technologically driven arms race is precisely the opposite – it is based on the development of autonomy, or a potential human 'out of the loop' scenario. Once we begin relying on automated data and information, we are increasingly likely to continue to do so and rely less on our own capacity to obtain the required information through non-technical means. For example, once we begin relying on Google Maps to move from A to B, we find it incredibly difficult or even impossible to imagine a scenario where we would have to return to reading a physical map or stopping to ask for directions. In a similar manner, AI and military-designed technology with a reliance on automated aids and decision-support systems, even if operated by humans, are more likely to play a significant and central role in the decisions the human takes. Even though a human may be responsible for a final decision, their reaction will be heavily influenced by information received from automated sources, similar to the google maps analogy.

In 2003, on the third day of the US-led invasion of Iraq, a British fighter jet was identified by the Vaunted Patriot, a US anti-missile system, as a legitimate target and subsequently its two pilots were killed. Three days later the same system also downed a US plane, killing the pilot. In effect, relying on an anti-missile system, the US took down an allied fighter jet and one of their own planes within three days of each other, with three casualties. Although there were humans in the loop, the heavy reliance on AI[365] eventually caused them to make decisions with catastrophic results. This is automation bias. It assumes that conditions are likely to remain unchanged and therefore makes decisions based on information that it was fed at a given moment in time and that has not necessarily been updated. But in situations of war and armed conflict things can change dramatically and very quickly such that the information input into an automated system may very quickly become obsolete or irrelevant.[366]

The second principle: prevention of harm states that '*AI systems should neither cause nor exacerbate harm* (Harms can be individual or collective, and can include intangible harm to social, cultural and political environments) *or otherwise adversely affect human beings'.*[367] A principle that clearly collides with the very nature of using AI in weapons, automated aids or decision-support systems, whose potential outcomes are lethal.

The third principle: Fairness *has* two main dimensions. The **substantive dimension** that '*implies a commitment to: ensuring equal and just distribution of both benefits and costs, and ensuring that individuals and groups are free from unfair bias, discrimination and stigmatisation'* and the **procedural dimension** understood as *"the ability to contest and seek effective redress against decisions made by AI systems and by the humans operating them. In order to do so, the entity accountable for the decision must be identifiable, and the decision-making processes should be explicable'.*

This principle clearly collides with use of force based on AI, especially when the potential outcome may be fatal and cannot be 'fixed'. But also, because it is impossible to ensure that these military technologies are 'free from unfair biases' given that most AI systems operate as a 'black box', meaning that it is virtually impossible to explain decisions taken by the AI, in the same way that an investigation on suspected breaches of IHL might now look at questions such as the orders given, chain of command, and other such military structures. Accountability in war is severely diminished through the use of AI.

The fourth principle: explicability, states that '*processes need to be transparent, the capabilities and purpose of AI systems openly communicated, and decisions – to the extent possible – explainable to those directly and indirectly affected. Without such information, a decision cannot be duly contested*'.

In reality, there is often a lack of 'explicability', or at least transparency, in warfare, both because combatants do not want their decisions to be contested or srutinised and because in a 'black-box scenario' the final decision often lies beyond explanation.

'Currently, an unknown number of countries and industries are researching and developing lethal autonomous weapon systems, ranging from missiles capable of selective targeting to learning machines with cognitive skills to decide whom, when and where to fight without human intervention. This raises fundamental ethical concerns, such as the fact that it could lead to an uncontrollable arms race on a historically unprecedented level, and create military contexts in which human control is almost entirely relinquished and the risks of malfunction are not addressed'.[368]

Fallacies, ethics and democracy

Many concepts related to AI and advanced digital technologies are poorly understood and based on assumptions rather than on facts. In this section we unpack some of the common but misleading assumptions about AI.

1. It is assumed that, if properly coded, a machine can learn how to *behave ethically and morally*. This bestows a moral agency on a machine, which is clearly impossible. AI cannot and does not have morals. It cannot comprehend anything as complex as human life, nor can it feel. It is just a machine.

2. It is assumed that AI can *make fairer, more effective and more efficient decisions than humans can*. In reality, AI simply follows what human beings have programmed it to do. In other words, if a machine is only partially programmed, it will reproduce this partiality in the decisions it makes. Humans who then may have to act on these machine-made decisions may thus be influenced by a machine and automated bias, trusting more in the machine than in human judgement, thus entrenching poor decisions made by automated systems. For the most part, the tech world is monopolised by white, upper-class men who will inevitably project and transfer their particular prejudices and biases on to the systems they are creating. AI is not neutral. It is a product of its designers and creators. Significant amounts of data must be input to train a machine to operate. It would be an extremely cumbersome, if not impossible, process to understand exactly how an AI system was programmed such that it made a particular decision. It is therefore highly irresponsible to produce weapons systems based on AI decision-making, with a capacity to lead to mass destruction and loss of life, without actually understanding each step along the decision making process, and the accountability for those decisions.

3. Finally, it is often assumed that AI is more reliable than human intelligence. In specific circumstances AI can certainly make reliable decisions, but in general terms this is far from being the norm.

It is worth highlighting the work of British NGO Big Brother Watch, which, under the Freedom of Information Act, succeeded in getting the government to reveal the reliability of facial recognition systems. On average 5% of the criminal identifications made through the AI system were correct, giving it an average error rate of 95%.[369]

The ecological dimension of warfare

Of course, it is not only human life that is directly devastated by war and armed conflict, but also ecological systems may be obliterated by deadly chemical or biological weapons, with consequences for populations living within those ecosystems and upon which their lives depend.

Examples of harming the planet, deliberately or inadvertently in the course of armed conflicts, range from the 'scorched earth' strategies employed against the Napoleonic invasion of Russia or in the two World Wars (destroying large areas of cultivation and cattle to halt the enemy's advance), the Vietnam war which carried out a systematic destruction of the environment as part of the military strategy (leading to the concept of 'ecocide'), or more recently the damage caused by combatant troops to livestock in the first Gulf War, when 80% of Kuwait's livestock were destroyed.[370] Not to mention the development of nuclear weapons, and the 'nuclear winter' scenario.

But we can go beyond war itself in order to understand that even in peacetime, the military sector is responsible for ecological erosion. As an example of the this, The SGR: Responsible Science report Under the radar: The carbon footprint of Europe's military sectors[371] estimated that the carbon footprint of EU military expenditure in 2019 was approximately 24.8 million tCO2e – which represents 'the equivalent to the annual CO2 emissions of about 14 million average cars, but is considered a conservative estimate, given the many data quality issues identified. This compares with the carbon footprint of the UK military expenditure in 2018 which was estimated at 11 million tCO2e in the earlier'.

The same report also underlines that 'With the highest military spending in the EU, France was found to contribute approximately one-third of the total carbon footprint for the EU's militaries. Of the military technology corporations operating in the EU that were examined, PGZ (based in Poland), **Airbus**, **Leonardo**, Rheinmetall, and **Thales** were judged to have the highest GHG emissions. Some military technology corporations did not publicly publish GHG emissions data, including MBDA, Hensoldt, KMW, and Nexter'. These companies are among the main beneficiaries of EU funding for military R&D under PADR and EDIDP.

No serious ethical checks of the projects were conducted including on the environmental aspects, nor with the European Commission's Green policy, from which the military is exempt.

We are on the threshold of a third arms evolution, which will give AI-controlled automated weapons the capacity to kill, albeit with a human 'in the loop' – which may be more accurately described as a sound-bite rather than providing for meaningful human engagement. This arms drive is continuing unabated, despite the colossal changes it may mean for how war is conducted and the appalling human consequences. It almost seems as if the advocates of these developments have been dazzled by shiny new technology without giving too much thought to those whose lives will be lost as a result.

This has created the perfect conditions for an ethics-free expansion of the EU industrial–military complex, which remains hidden from the public eye, and pushes the boundaries of IHL. Rather than seeking to adapt the new weapons systems to meet the stipulations of IHL or to create specific EU standards for these new systems, the European Commission is actively ploughing ahead with a virtually unregulated development of technologies.

In this sense, the application of Article 36, which relates to weaponry reviews, should not be reduced to a box-ticking exercise, nor should compliance be delegated to those submitting funding applications to the EDF. Given that this represents the first stage of commitment to upholding IHL, the failure to take it seriously raises doubts not only about EU's collective Defence Policy, but also about the willingness of EU member states in choosing to delegate part of the military R&D to the EU without setting clear legal and ethical review process in line with their obligations. As a result, the EU is lowering the R&D standards for weapons and military technologies below existing national practice in both the legal and ethical spheres.

Moreover, the EC is actively generating a military exception in the very core of the EU as PADR and EDIDP projects contravene even general EU legal frameworks, principles, ethics and policies, such as the precautionary principle, the notion of human dignity, its Green Policy or the Ethical Guidelines for Trustworthy AI – in the latter case, there have been ad hoc exceptions made for the military in order to avoid open conflicts – a policy and agenda that also embodies the deliberate intention to ignore the repeated calls made by the European Parliament to enact specific regulation.

CONCLUSION

The origins of the EU arose from the desire to establish peace and stability in a continent that was ravaged by war during the first half of the 20th century. In recent years, however, it has shifted from promoting peace and diplomacy to militarism and laying the groundwork for war. The implications of this shift are vast. Within the EU, militarism is increasingly perceived as the solution to political and social problems with voices that favour peace and diplomacy being marginalised. Some non-EU countries in Europe and beyond may well either embrace the EU's drive towards militarism and purchase arms and other materiel from companies based in EU member states, or interpret this military drive as provocative and arm themselves in response. As the EU –and certain member states – become increasingly militarised, it moves further from its founding vision and values.

The arms industry, which was instrumental in influencing the EU's policy shift and subsequent defence budgets, stands to make vast profits. Public money is being used to subsidise some of Europe's most lucrative industries. Worse still, the EU is funding companies that export arms to countries undergoing armed conflict and where gross human rights violations may ultimately be facilitated by European arms companies, including those dealing in nuclear weapons or embroiled in serious corruption allegations. By violating its own values, particularly in upholding the rule of law, the EU's legitimacy as a political institution is brought into question, severely undermining its identity as a promotor of peace.

The rules of engagement in situations of war and armed conflict are necessarily complex in order to safeguard human life. Yet the structures the EC has established to guarantee that the projects it funds do not contravene ethical and legal norms are based on companies' self-assessment – box-ticking exercises rather than serious and rigorous efforts to exclude controversial technologies. This suggests that the EU is more concerned with innovation and protecting corporate profits rather than ensuring that no public money is spent on weaponry that, if deployed, could potentially change the conduct of war and render obsolete the current rules of war embodied in the Geneva Conventions and other binding international treaties and resolutions. Funding controversial 'smart' technologies and other cutting-edge equipment puts the EU on a direct collision course with fundamental human rights norms and International Humanitarian Law (IHL).

The AI regulations the EU is currently drafting explicitly exempt AI equipment for military use, but to date there is no pending regulation specific to such equipment, leaving it virtually unregulated. Despite the potential consequences and serious concerns about its application, the EU is pushing ahead with AI technology, prioritising innovation, business and corporate profit over human life and safety. Moreover, there appears to be a deliberate gap in publicly available information regarding the projects funded under the EU's defence budget and, more concretely, the standards applied to approve them. The EU appears to be more invested in circumventing transparency and oversight procedures and obfuscating democratic process rather publishing information on how it is spending public money.

The eagerness to develop and export innovative weapons and materiel has been decoupled from the impact their deployment could have in terms of the major loss of life, destruction and devastation. As an institution, the EU should acknowledge that it is making a political choice to invest in armaments, prop up the arms industry and prioritise militarism over the security and

wellbeing of society. Rather than expanding military budgets and helping to fuel a new arms race, the EU should reaffirm its founding principles and commit to promoting peace, dialogue and full respect for human rights.

The EU should, therefore, move away from a militarised approach to security, from which only the arms industry benefits, and prioritise collective wellbeing, security and solidarity. EU policy and budgets should be dedicated to tackling the root causes of conflict, beginning with recognising Europe's role in them. Similarly, it should put its full political, diplomatic and financial weight to helping to prevent conflicts before they escalate and prioritise peaceful solutions when they do.

Using soft backed up by hard power is not conducive to working towards positive peace. By strengthening its military power, engaging militarily in countries outside Europe, as well as by exporting arms, the EU is undermining its role in diplomacy or as a credible mediator in situations of conflict. In prioritising a militarised approach, peaceful resolution and dialogue risk being side-lined. It is often argued that with more advanced military equipment, it is easier to bring armed disputes to an end more quickly, but conflict frequently stems from political discord and grievances will never be resolved militarily. Attempting to do so only prolongs the civilian suffering and further deepens the divide between the opposing sides.

The world is facing many global challenges, not least the climate crisis and the increased likelihood of drought and rising temperatures making vast areas of the planet uninhabitable, with potentially catastrophic consequences, including conflicts. If the EU employs a militarised approach to addressing political and social issues, it risks being more part of the problem rather than part of the solution. It is, therefore, imperative that the EU invests all of the resources at its disposal in helping to bring peaceful, enduring, political solutions to conflict and human suffering.

Endnotes

1   European Commission (2022) 'Commission contribution to European defence'. COM(2022) 60 Final. Strasbourg. 15 February. https://ec.europa.eu/info/sites/default/files/com_2022_60_1_en_act_contribution_european_ defence.pdf

2   European Commission webpage for PADR: https://ec.europa.eu/defence-industry-space/eu-defence-industry/ preparatory-action-defence-research-padr_en

3   European Commission webpage for the EDIDP: https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-industrial-development-programme-edidp_en

4   Feinstein A (2012) The Shadow World Inside the Global Arms Trade. http://www.theshadowworldbook.com

5   European Commission webpage for PADR: https://ec.europa.eu/defence-industry-space/eu-defence-industry/ preparatory-action-defence-research-padr_en

6   European Commission webpage for the EDIDP: https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-industrial-development-programme-edidp_en

7   European Commission webpage for the European Defence Fund. https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-fund-edf_en

8   European Commission (30 November 2016) 'European Defence Action Plan', COM(2016) 950 final. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0950&from=en

9   European Commission (30 November 2016) 'European Defence Action Plan: Towards a European Defence Fund', press release. https://ec.europa.eu/commission/presscorner/detail/en/IP_16_4088

10   Vranken, B. (2017) 'Securing Profits: How the arms lobby is hijacking Europe's defence policy'. Vredesactie. https://www.vredesactie.be/sites/default/files/pdf/Securing_profits_web.pdf

11   European Commission (27 March 2015) 'Commissioner Bieńkowska launches high-level group on defence research'. https://ec.europa.eu/newsroom/growth/items/48192/en.

12   For the list of members of the Group of Personalities, see: https://ec.europa.eu/docsroom/documents/9564/ attachments/1/translations/en/renditions/pdf

13   Vranken, B. (2017) 'Securing Profits'.

14   Mauro, M.F. and Thoma, K. (2016) 'The future of EU defence research', Policy Department Directorate-General for External Policies, European Parliament. https://www.europarl.europa.eu/RegData/etudes/STUD/2016/535003/ EXPO_STU%282016%29535003_EN.pdf

15   ENAAT (2018) 'noEUmoney4arms: online information tool'. http://enaat.org/wp-content/ uploads/2017/11/2018.04.27_ENAAT_OnlineTool_DefenceFund_version01.pdf; Vanheste, T. (15 September 2016) 'Dit is de wapenlobby waardoor de EU in zo'n hoog tempo militariseert', De Correspondent. https://decorrespondent.nl/5250/dit-is-de-wapenlobby-waardoor-de-eu-in-zon-hoog-tempo-militariseert/242203500-ea50b5eb

16   Group of Personalities (2016) 'European defence research: The case for an EU-funded defence R&T programme', EUISS/European Commission. https://www.iss.europa.eu/sites/default/files/EUISSFiles/GoP_report.pdf

17   ENAAT (12 July 2019) 'All you want to know about the EU Defence Fund, and why this is not good for peace nor for jobs and growth'. http://enaat.org/eu-defence-fund (Question 11)

    An EU consortium is an association of two or more individuals, organizations, companies, universities, public authorities working together in an EU project towards a shared objective. https://eucalls.net/helpcenter/question.php?q=what-is-an-eu-partnership

18   European Commission (7 June 2017) 'Launching the European Defence Fund – Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions' COM(2017) 295 final. https://ec.europa.eu/docsroom/documents/23605/attachments/2/translations/en/ renditions/native

19   ASD (22 January 2018) 'European Parliament and Defence Industry discuss the future of the EU defence industrial policy'. https://asd-europe.org/european-parliament-and-defence-industry-discuss-the-future-of-the-eu-defence-industrial-policy

20   ASD (3 October 2019) 'High-level conference in Helsinki: How to make the most of the European Defence Fund?'. https://www.asd-europe.org/high-level-conference-in-helsinki-how-to-make-the-most-of-the-european-defence-fund

21   Hayes, B. (2009) 'NeoConOpticon: The EU Security-Industrial Complex'. Statewatch/TNI. https://www.statewatch.org/media/documents/analyses/neoconopticon-report.pdf

22   Jones, C. (2017) 'Market Forces: The development of the EU security-industrial complex'. Statewatch/TNI. https://www.tni.org/files/publication-downloads/marketforces-report-tni-statewatch.pdf

23   For a list of publications, see: http://enaat.org/european-union/enaat-documents-and-interesting-links-related-to-the-eu

24   ENAAT (2016) 'Why the EU should not subsidize military research: ENAAT Position Paper on the proposal of Preparatory action on Defence research'. http://enaat.org/wp-content/uploads/2017/03/ENAAT-Position-on-Defence-research-PA_FINAL.pdf

25   ENAAT (2019) 'What is the European Defence Fund? – factsheet'. http://enaat.org/wp-content/uploads/2019/04/ENAAT-DefenceFund-Flyer_long-EN.pdf

26   European Commission (15 June 2020) 'Questions and Answers on the precursor programmes of the European Defence Fund. https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1052

27   ENAAT (2019) 'What is the European Defence Fund?'.

28   According to its published information, the EU contributed €576.47 million to 62 projects under the PADR and the EDIDP. https://ec.europa.eu/defence-industry-space/eu-defence-industry/preparatory-action-defence-research-padr_nl; https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-industrial-development-programme-edidp_en

      There is a slight discrepancy in the total figures because part of the budget is allocated to administrative costs that do not feature in the overall project budget.

29   https://eda.europa.eu/what-we-do/all-activities/activities-search/pilot-project-and-preparatory-action-for-defence-research

30   OCCAR is 'an international organisation whose core-business is the through life management of cooperative defence equipment programmes'. Member States are Belgium, France, Germany, Italy, Spain and the UK. http://www.occar.int/about-us.

31   European Commission (30 June 2021) 'European Defence Industrial Development Programme 2020 – Factsheet'. https://ec.europa.eu/defence-industry-space/system/files/2021-07/DEFIS%20_%20EDIDP%20Factsheet%20_%2030%20June%202021__._0.pdf

32   European Commission (30 June 2021) 'Defence Industry: the Commission kick-starts the European Defence Fund with €1.2 billion and awards 26 new industrial cooperation projects for more than €158 million', press release. https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3325   As a standard practice, the EU publishes information sheets with an overview of the entities participating in funded projects. With regard to the EDIDP, the EU announced at the end of June 2021 that it had selected 26 projects but has not yet published a breakdown of the funding to the level of participating entities for all projects.

33   See response of DEFIS. https://www.asktheeu.org/en/request/9738/response/32646/attach/2/Letter%20signed.pdf?cookie_passthrough=1; also see an earlier request at https://www.asktheeu.org/en/request/details_of_selected_projects_und#incoming-27173   We tried to get the missing figures via access to documents requests, but the Directorate-General for Defence Industry and Space (DG DEFIS) of the European Commission says they are not yet available, because 'the EU funding will only be committed once the grant agreements will be signed with the beneficiaries'.

34   European Commission (30 June 2021) 'The European Defence Fund – Factsheet'. https://ec.europa.eu/defence-industry-space/system/files/2021-06/DEFIS%20_%20EDF%20Factsheet%20_%2030%20June%202021.pdf

35   European Commission (15 June 2020a) 'Questions and Answers on the precursor programmes of the European Defence Fund'. https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1052

36   European Commission (15 June 2020b) 'European Defence Fund: €205 million to boost the EU's strategic autonomy and industrial competitiveness', press release. https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1053; https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-industrial-development-programme-edidp_en

37   Mauro, F., Simon, E. and Savier, A. I. (2021) '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)', Policy Department for External Relations, European Parliament. https://www.europarl.europa.eu/RegData/etudes/STUD/2021/653638/EXPO_STU(2021)653638_EN.pdf

38   ASD (28 September 2017) 'European Industry's views on the Proposal for a Regulation establishing the European Defence Industrial Development Programme'. https://www.asd-europe.org/sites/default/files/atoms/files/ASD%20Industry%27s%20views%20EDIDP%202017.pdf

39   Further information at: https://ocean2020.eu/

40   See Table 2.

41   https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-industrial-development-programme-edidp_en; www.fdc.fr/wp-content/uploads/2021/02/GEODE_Press_Release_Feb2021.pdf

42   Galileo is the global navigation satellite system created by the European Space Agency.

43   https://ec.europa.eu/defence-industry-space/eu-defence-industry/european-defence-industrial-development-programme-edidp_en

44   Regulation (EU) 2018/1092 of the European Parliament and of the Council of 18 July 2018 establishing the European Defence Industrial Development Programme aiming at supporting the competitiveness and innovation capacity of the Union's defence industry. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1092&from=EN

45   European Commission (2021a), ALTISS – Factsheet. https://ec.europa.eu/defence-industry-space/system/files/2021-06/EDIDP2020_factsheet_SME%20ALTISS.pdf; European Commission (2021b) JEY-CUAS – Factsheet. https://ec.europa.eu/defence-industry-space/system/files/2021-06/EDIDP2020_factsheet_CUAS_JEY-CUAS.pdf; European Defence Agency, OCEAN 2020 – Factsheet. https://eda.europa.eu/docs/default-source/padr/padr-ocean2020-projectweb_v4.pdf

46   Total sums for companies calculated by adding up the funding for their own companies and percentages of funding for subsidiaries and joint ventures equal to their percentages of ownership. For Leonardo and Airbus this includes 37.5% of the funding received by MBDA, which itself would be among the top 15 beneficiaries with €6.93 million funding of its own.

47   Official head office is located in The Netherlands.

48   Official head office is located in The Netherlands.

49   European Commission (15 June 2020) 'Questions and Answers on the precursor programmes of the European Defence Fund'. https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1052

50   https://ec.europa.eu/defence-industry-space/system/files/2021-06/EDIDP_DA_MALE%20RPAS.pdf

51   https://ec.europa.eu/defence-industry-space/document/download/9137c6cc-52a0-49e8-b9d8-3a86804491b0_en

52   See the following chapter for further details on corruption allegations

53   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

54   Vranken, B. (2017) 'Securing Profits'.

55   Ranking top-100 arm- producing companies, defence revenue: taken from Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/; Total revenues, number of employees: taken from annual reports companies; Brussels lobby budget, number of meetings with European Commission (since 1 December 2014): taken from EU Transparency Register. https://ec.europa.eu/transparencyregister/public/homePage.do; Controversial arms-export destinations: this is not a comprehensive overview, we used the list of controversial destinations compiled by PAX and ProFundo in: Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; and, as they did, the SIPRI Arms Transfers Database. https://www.sipri.org/databases/armstransfers – this database is limited to the transfer of major conventional weapons to list arms exports, supplemented with information from the websites of the companies and from (military) press outlets; percentages of state ownership taken from Marketscreener.com

56   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

57   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/; Defence revenue is calculated in US dollar amounts irrespective of the currency in which it is received or generated.

58   Leonardo (2021) 'Integrated Annual Report'. https://www.leonardo.com/documents/15646808/0/Searchable+INTEGRATED+ANNUAL+REPORT+2020+final.pdf/847a20bb-6896-793d-5b3d-178064fa728d?t=1620048710054

59   Leonardo (2021) 'Integrated Annual Report'. https://www.leonardo.com/documents/15646808/0/Searchable+INTEGRATED+ANNUAL+REPORT+2020+final.pdf/847a20bb-6896-793d-5b3d-178064fa728d?t=1620048710054

60   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=02550382403-01

61   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=02550382403-01&pdf=true

62   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

63   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

64   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

65   Indra Sistemas, S.A. And Subsidiaries (2021) 'Consolidated Financial Statements for the year ended 31 December 2020 and Consolidated Directors Report, together with Independent Auditor's Report'. https://www.indracompany.com/sites/default/files/2020_consolidated_annual_accounts_and_management_report_0.pdf

66   Indra Sistemas, S.A. And Subsidiaries (2021) 'Consolidated Financial Statements for the year ended 31 December 2020 and Consolidated Directors Report, together with Independent Auditor's Report'. https://www.indracompany.com/sites/default/files/2020_consolidated_annual_accounts_and_management_report_0.pdf

67   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=208351410839-33

68   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=208351410839-33&pdf=true

69   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

70   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

71   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

72   Safran (2021) '2020 Integrated Report'. https://www.safran-group.com/media/351990/download

73   Safran (2021) '2020 Integrated Report'. https://www.safran-group.com/media/351990/download.

74   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=764184537594-67

75   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=764184537594-67&pdf=true

76   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

77   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

78   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

79   Thales (2021) '2020 Universal registration document including the Annual Financial Report'. https://www.thalesgroup.com/sites/default/files/database/document/2021-05/Universal%20Registration%20Document%202020%20%28URD%29.pdf

80   Thales (2021) '2020 Universal registration document including the Annual Financial Report'. https://www.thalesgroup.com/sites/default/files/database/document/2021-05/Universal%20Registration%20Document%202020%20%28URD%29.pdf

81   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=91711831031-23

82   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=91711831031-23&pdf=true

83   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

84   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

85   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

86   Airbus (2021) 'Financial Statements 2020'. https://www.airbus.com/sites/g/files/jlcbta136/files/2021-06/AIRBUS_FINANCIAL_STATEMENTS_2020_1.pdf; This is a significant drop from 2019 (total revenue: €70,478 billion), due to the consequences of COVID-19.

87   Airbus (2021) 'Financial Statements 2020'. https://www.airbus.com/sites/g/files/jlcbta136/files/2021-06/AIRBUS_FINANCIAL_STATEMENTS_2020_1.pdf

88   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=2732167674-76

89   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=2732167674-76&pdf=true

90   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

91   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

92   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

93   Saab (2021) 'Annual and Sustainability Report 2020'. https://www.saab.com/globalassets/cision/documents/2021/20210304-saab-publishes-its-annual-and-sustainability-report-2020-en-0-3908922.pdf

94   Saab (2021) 'Annual and Sustainability Report 2020'. https://www.saab.com/globalassets/cision/documents/2021/20210304-saab-publishes-its-annual-and-sustainability-report-2020-en-0-3908922.pdf

95   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=86477889163-49

96   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=86477889163-49&pdf=true

97   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

98   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

99   Defense News (n.d.) 'Top 100 for 2021'. https://people.defensenews.com/top-100/

100   Hensoldt (2021) 'Annual Report 2020'. https://annualreport.hensoldt.net/resource/en/Downloads/HENSOLDT_Annual_Report_2020.pdf

101   Hensoldt (2021) 'Annual Report 2020'. https://annualreport.hensoldt.net/resource/en/Downloads/HENSOLDT_Annual_Report_2020.pdf

102   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=829019131787-70

103   https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=829019131787-70&pdf=true

104   Hensoldt (27 September 2018) 'Hensoldt finalizes separation from Airbus', press release. https://www.hensoldt.net/news/hensoldt-finalizes-separation-from-airbus/

105   Slijper, F. and Oudes, C. (2020) 'Controversial arms trade and investments of insurers'. PAX/Eerlijke Verzekeringswijzer. https://eerlijkegeldwijzer.nl/media/496454/2020-12-praktijkonderzoek-controversial-arms-trade.pdf; SIPRI Arms Transfers Database (n.d.). https://www.sipri.org/databases/armstransfers

106   Fraunhofer (2021) 'Annual Report 2020'. https://www.fraunhofer.de/content/dam/zv/en/Publications/fraunhofer-annual-report-2020_web.pdf

107   Fraunhofer (2021) 'Annual Report 2020'. https://www.fraunhofer.de/content/dam/zv/en/Publications/fraunhofer-annual-report-2020_web.pdf

108 https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=35124436517-75

109 https://ec.europa.eu/transparencyregister/public/consultation/displaylobbyist.do?id=35124436517-75&pdf=true

110 https://www.fraunhofer.de/en/about-fraunhofer/profile-structure.html

111 See: https://urgewald.org/yemen

112 ECCHR et al. (2020) 'Made in Europe, bombed in Yemen: How the ICC could tackle the responsibility of arms exporters and government officials', case report. https://www.ecchr.eu/fileadmin/Fallbeschreibungen/ CaseReport_ECCHR_Mwatana_Amnesty_CAAT_Delas_Rete.pdf

113 https://www.defenceweb.co.za/industry/industry-industry/hensoldt-optronics-and-saudi-arabias-intra-sign-cooperation-agreement/

114 Baars, B. (2017) 'Nederlandse wapens en Turks militair optreden', Stop Wapenhandel. https://stopwapenhandel.org/app/uploads/2017/03/WapensTurkije.pdf

115 Current signatories to the Treaty on the Prohibition of Nuclear Weapons. https://treaties.unoda.org/t/tpnw

116 Beenes, M. (2019) 'Beyond the bomb: Global exclusion of nuclear weapon producers', PAX. https://www.dontbankonthebomb.com/wp-content/uploads/2019/10/201910_Beyond-the-bomb_final.pdf

117 Snyder, S. (2019) 'Producing Mass Destruction: Private companies and the nuclear weapon industry', PAX. https://www.dontbankonthebomb.com/wp-content/uploads/2019/05/2019_Producers-Report-FINAL.pdf

118 Topychkanov, P. (November 2020) 'Assessing the modernization of nuclear postures'. https://cms.apln.network/ wp-content/uploads/2020/12/Topychkanov_Modernization-Nagasaki_WP_20201029_final.pdf

119 Béraud-Sudreau, L. et al. (2020) 'Mapping the international presence of the world's largest arms companies', SIPRI Insights on Peace and Security No. 2020/12. https://www.sipri.org/sites/default/files/2020-12/ sipriinsight2012_mapping_the_international_presence_of_the_worlds_largest_arms_companies.pdf.

120 https://www.mbda-systems.com/about-us/

121 Dassault Aviation owns 26.4% of Thales

122 Leonardo (24 April 2021) 'Leonardo to acquire a 25.1% stake in HENSOLDT AG for approx. € 606 million', press release. https://www.leonardocompany.com/en/press-release-detail/-/detail/24-04-2021-leonardo-acquista

123 European Union (2016) 'Shared Vision, Common Action: A Stronger Europe – A Global Strategy for the European Union's Foreign and Security Policy'. https://eeas.europa.eu/sites/default/files/eugs_review_web_0.pdf

124 European Commission (10 December 2020) 'Commission welcomes the political agreement on the European Defence Fund', press release, https://ec.europa.eu/commission/presscorner/detail/en/IP_20_2319

125 Brzozowski, A. (2019) 'Loiseau: Without arms exports, there won't be a European defence industry', EURACTIV. com, 7 October. https://www.euractiv.com/section/defence-and-security/news/loiseau-without-arms-exports-there-wont-be-a-european-defence-industry/

126 Group of Personalities (2016) 'European Defence Research: The case for an EU-funded defence R&T programme', European Union Institute for Security Studies, European Commission. https://www.iss.europa.eu/sites/default/ files/EUISSFiles/GoP_report.pdf

127 European Commission (30 November 2016) 'European Defence Action Plan', COM(2016) 950 final. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0950&from=EN

128 Regulation (EU) 2018/1092 of the European Parliament and of the Council of 18 July 2018 establishing the European Defence Industrial Development Programme aiming at supporting the competitiveness and innovation capacity of the Union's defence industry. https://eur-lex.europa.eu/legal-content/EN/TXT/ PDF/?uri=CELEX:32018R1092&from=EN

129 European Commission (13 June 2018) 'Proposal for a regulation of the European Parliament and of the Council establishing the European Defence Fund', COM(2018) 476 final. https://eur-lex.europa.eu/resource. html?uri=cellar:03540883-6efd-11e8-9483-01aa75ed71a1.0001.03/DOC_1&format=PDF

130 Ibid.

131 FDC (8 February 2021) 'GEODE: establishing the framework for developing the Galileo PRS military user segment', press release. http://www.fdc.fr/wp-content/uploads/2021/02/GEODE_Press_Release_Feb2021.pdf

132 Indra (19 June 2020) 'Indra, the company that will lead the most projects in the construction of European Defence'. https://www.indracompany.com/en/noticia/indra-company-will-lead-projects-construction-european-defence

133 Estonian Defence Industry Association (16 June 2020) 'Estonian defence industry companies made history in EDIDP calls'. https://defence.ee/news/estonian-defence-industry-companies-made-history-in-edidp-calls/

134 Mauro, F., Simon, E. and Savier, A.I. (2021) 'Review'.

135 Under PADR €1.68 million goes to the NATO Science and Technology Organisation (project OCEAN2020), which is described as 'International'.

136 This figure was calculated for 2003 by Joe Roeber in work undertaken for Transparency International. Roeber, J. (2005) 'Hard-wired for corruption: the arms trade and corruption', Prospect, 113 (28 August 2005).

137   See Feinstein, A., Holden, P. and Pace, B. (2011) 'Corruption and the arms trade: sins of commission'.
      https://www.sipri.org/sites/default/files/SIPRIYB1101.pdf

138   Ibid. Feinstein et al.

139   https://www.imf.org/external/pubs/ft/wp/2000/wp0023.pdf

140   For further information on this see: https://www.law.cornell.edu/wex/plea_bargain

141   https://aerocorner.com/manufacturers/agustawestland/

142   See the following paragraphs for further details.

143   https://www.leonardocompany.com/en/press-release-detail/-/detail/24-04-2021-leonardo-acquista

144   https://members.parliament.uk/member/357/career

145   Substantiating details may be found at: https://shadowworldinvestigations.org/wp-content/
      uploads/2019/09/54261c_1796bde1633445f0a98ceec15d404203.pdf

146   https://shadowworldinvestigations.org/wp-content/
      uploads/2019/09/54261c_1796bde1633445f0a98ceec15d404203.pdf

147   Ibid.

148   Silvia D'Ascoli, 2011. Sentencing in International Criminal Law,

149   https://scroll.in/latest/849291/agustawestland-case-cbi-files-chargesheet-against-former-air-force-chief-sp-tyagi-
      nine-others

150   https://shadowworldinvestigations.org/wp-content/
      uploads/2019/09/54261c_1796bde1633445f0a98ceec15d404203.pdf

151   https://shadowworldinvestigations.org/wp-content/
      uploads/2019/09/54261c_1796bde1633445f0a98ceec15d404203.pdf

152   https://www.mbda-systems.com/about-us/history/

153   https://www.transparency.org/files/content/pressrelease/TI-UK_Note_BAE_Corruption_Cases_settlements_
      Final_11-2-10.pdf See for context: Allegations of corrupt activity by BAE in Tanzania. See here:
      https://www.theguardian.com/global-development/poverty-matters/2012/mar/20/bae-payment-tanzania-justice-
      accountability

154   https://www.bbc.co.uk/news/business-19498916

155   https://www.lemonde.fr/economie-francaise/article/2015/01/18/une-justice-hexagonale-trop-lente-face-au-
      volontarisme-des-autorites-americaines_4558526_1656968.html

156   https://www.jeuneafrique.com/4001/economie/corruption-au-nigeria-safran-relax-en-appel-paris/

157   https://www.reuters.com/article/dassault-fine-idUSL8N1N07M1

158   https://www.ft.com/content/8cc5835c-57a9-11df-855b-00144feab49a

159   For more context see: https://www.taiwannews.com.tw/en/news/2682700 Various people have been indicted but
      nobody has been convicted. The main suspect is dead.

160   https://www.asiasentinel.com/p/france-unravel-arms-scandal

161   https://www.reuters.com/article/dassault-fine-idUSL8N1N07M1

162   "These were destined for intermediaries who would later distribute the cash to dignitaries of the purchasing
      country."-

 https://www.mediapart.fr/en/journal/international/011010/karachi-bribes-bloodshed-and-buried-truth?onglet=full

163   https://sites.tufts.edu/corruptarmsdeals/laffaire-karachi/

164   https://sites.tufts.edu/corruptarmsdeals/laffaire-karachi/

165   https://sites.tufts.edu/corruptarmsdeals/laffaire-karachi/

166   https://www.mediapart.fr/journal/international/080421/rafale-papers-les-documents-qui-font-trembler-l-inde-et-
      la-france ; https://scroll.in/latest/991751/indian-authorities-sat-on-evidence-that-millions-of-euros-were-paid-to-
      rafale-middleman-mediapart

167   https://www.reuters.com/article/us-safrica-zuma-idUSKBN2AN0W2

168   https://www.reuters.com/world/africa/safricas-ex-president-zuma-appears-court-corruption-plea-2021-05-26/
      and https://www.dailymaverick.co.za/article/2020-05-20-thales-how-to-buy-a-country/

169   https://www.efe.com/efe/english/world/former-greek-defense-minister-wife-jailed-accused-of-money-
      laundering/50000262-3790905

170   https://greekcitytimes.com/2018/11/15/former-greek-prime-minister-to-be-investigated/ ;
      https://eu-ocs.com/former-greek-minister-to-arrested-on-corruption-charges/

171   https://www.law360.com/articles/1272000/doj-launches-probe-into-raytheon-s-payments-in-middle-east ;
      https://insidedefense.com/insider/raytheon-receives-sec-subpoena ; https://complianceconcourse.willkie.com/
      articles/news-alerts-2020-05-may-20200511-massachusetts-defense-technology

172 https://www.ft.com/content/f7a01a60-442b-11ea-abea-0c7a29cd66fe

173 https://www.theguardian.com/business/2020/jan/31/airbus-to-pay-record-3bn-in-fines-for-endemic-corruption

174 https://www.reuters.com/article/airbus-group-austria-inquiry/austria-widens-investigation-into-eurofighter-deal-idUSL8N2AI4DQ

175 https://www.reuters.com/article/airbus-group-austria-inquiry/austria-widens-investigation-into-eurofighter-deal-idUSL8N2AI4DQ

176 https://www.reuters.com/article/airbus-group-austria-inquiry/austria-widens-investigation-into-eurofighter-deal-idUSL8N2AI4DQ

177 https://www.reuters.com/article/us-airbus-nl-court/airbus-ordered-to-pay-99-million-fine-in-eurofighter-case-idUSKBN1FT2GB

178 https://www.reuters.com/article/airbus-probe-ghana-idUSL8N2A32H3 ; https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Ghana-faces-setback-as-UK-SFO-drops-all-charges-against-Airbus-suspect-due-to-lack-of-evidence-1348930

179 https://www.wsj.com/articles/airbus-subsidiary-pleads-guilty-in-saudi-bribery-case-11619631031

180 https://www.wsj.com/articles/airbus-subsidiary-pleads-guilty-in-saudi-bribery-case-11619631031

181 https://shadowworldinvestigations.org/wp-content/uploads/2019/09/54261c_36e32b4a84804a52ad6ef993fa9b9d67.pdf

182 https://shadowworldinvestigations.org/wp-content/uploads/2019/09/54261c_38511e7837d341f7b4fd46fc7cbc15ef.pdf

183 Press release on Saab's website: https://www.saab.com/newsroom/press-releases/1999/south-africa-orders-british-aerospacesaab-gripen-and-hawk-jets

184 https://www.dailymaverick.co.za/article/2020-06-23-fana-hlongwane-agent-of-bae-systems/

185 https://sites.tufts.edu/corruptarmsdeals/gripen-combat-aircraft-sales-to-the-czech-republic-and-hungary/

186 https://www.nytimes.com/2007/11/25/business/25bae.html

187 Ibid.

188 https://www.nytimes.com/2007/05/11/business/worldbusiness/11iht-corrupt.4.5672628.html

189 https://www.reuters.com/article/uk-austria-count-trial-idUKBRE90G0J920130117

190 Masson, H. (2021) 'Precursor Programmes of the European Defence Fund. Preparatory Action on Defence Research (PADR), European Defence Industrial Development Programme (EDIDP)', FRS document. https://www.frstrategie.org/sites/default/files/documents/specifique/PADR-EDIDP.pdf

191 Gaudiaut, T. (2021) 'Les pays avec les plus fortes dépenses militaires', Statista.com, 28 April. https://fr.statista.com/infographie/24751/classement-des-pays-depenses-militaires-budget-defense/

192 Propos liminaires de Florence Parly, ministre des Armées, devant la sous-commission défense et sécurité du Parlement européen le 2 juillet 2020, Ministère des Armées, 2 juillet 2020. https://www.defense.gouv.fr/english/salle-de-presse/discours/discours-de-florence-parly/propos-liminaires-de-florence-parly-ministre-des-armees-devant-la-sous-commission-defense-et-securite-du-parlement-europeen-le-2-juillet-2020

193 "Ce que la crise des sous-marins peut changer pour la défense européenne", Le Progres.fr, 5 octobre 2021, https://www.leprogres.fr/defense-guerre-conflit/2021/10/05/ce-que-la-crise-des-sous-marins-peut-changer-pour-la-defense-europeenne

194 For more context on EU military missions see: https://eeas.europa.eu/headquarters/headquarters-homepage_en/430/Military%20and%20civilian%20missions%20and%20operations

195 Corporate Europe Observatory (2019, 11 November) 'Thierry Breton, the corporate commissioner?'. https://corporateeurope.org/en/2019/11/thierry-breton-corporate-commissioner

196 Gros-Verheyde, N. (2021, 30 November) 'La Presidence française de l'UE démarre dans un mois', B2 Le blog de l'Europe géopolitique. https://www.bruxelles2.eu/2021/11/la-presidence-francaise-de-lue-demarre-dans-un-mois-le-calendrier/

197 See for example procdure files for the EDIDP https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2017/0125(COD)&l=en and for the Defence Fund

198 Own findings for this report based on project descriptions made public by the European Commission and Defence Agency

199 Ibid – own findings and project descriptions

200 Observatoire des armements et al. (2019, 7 November) 'Base militaire, checkpoints et prison secrète: un rapport pointe la "militarisation" des infrastructures de Total au Yémen'.http://www.obsarm.org/spip.php?article325

201 Ibid.

202 Peri, D. (2019, 19 November) 'Discussing joint patrols with India in Indian Ocean: French Navy chief'. https://www.thehindu.com/news/national/discussing-joint-patrols-with-india-in-indian-ocean-french-navy-chief/article30013561.ece

203 Ministère des Armées (n.d.) 'Patrouilleurs: le renouvellement'. https://www.defense.gouv.fr/content/ download/599159/10108128/file/Marine%20nationale%20-%20patrouilleurs%20-%20le%20renouvellement.pdf

204 'Compte rendu – Commission de la défense nationale et des forces armées – Audition de l'amiral Christophe Prazuck, chef d'état-major de la marine'. Assemblée nationale, 3 July 2019. https://www.assemblee-nationale.fr/ dyn/15/comptes-rendus/cion_def/l15cion_def1819046_compte-rendu

205 Observatoire des armements et al. (2019, 7 November) 'Base militaire'.

206 Observatoire des armements et al. (2019, 7 November), op.cit.

207 Ibid.

208 Lert, F. (2021) 'L'Indonésie signe une lettre d'intention pour l'acquisition de 36 Rafale', aerobuzz.fr, 14 June. https://www.aerobuzz.fr/defense/lindonesie-signe-une-lettre-dintention-pour-lacquisition-de-36-rafale/

209 Bezat, J.-M. and Rafenberg, M. (2021) 'La France vend trois frégates de défense à la Grèce, deux semaines après la crise des sous-marins avec l'Australie'. Le Monde, 28 September. https://www.lemonde.fr/economie/ article/2021/09/28/la-france-vend-trois-fregates-de-defense-a-la-grece-deux-semaines-apres-la-crise-des-sous- marins-avec-l-australie_6096287_3234.html

210 Sedou, L. (2021, 21 September) 'News from the Brussels Bubble', Enaat. http://enaat.org/wp-content/ uploads/2021/09/ENAAT-NBB-2021-3_21.09.2021.pdf#2021-3, 21 September 2021

211 'L'Indo mais pas le Pacifique. L'Europe revoit son ambition maritime à la baisse. L'opération Atalanta reconfigurée ?', Nicolas Gros-Verheyde, B2pro, 19 January 2022, https://club.bruxelles2.eu/2022/01/lindo-mais-pas-le- pacifique-leurope-revoit-son-ambition-maritime-a-la-baisse-loperation-atalanta-reconfiguree/ (last accessed 15/02/22)

212 Like the MIRICLE project (https://ec.europa.eu/defence-industry-space/miricle_en) or the SEANICE project (https://ec.europa.eu/defence-industry-space/seanice_en)

213 Résultats des appels EDIDP 2020, https://www.safecluster.com/actualites/actualites-innovation/resultats- des-appels-edidp-2020/ and Navantia Participates In The Largest Project Of The European Defense Industrial Development Program (EDIDP), Navalnews, 14 juillet 2021, https://www.navalnews.com/naval-news/2021/07/ navantia-participates-in-the-largest-project-of-the-european-defense-industrial-development-program-edidp/

214 Factsheet USSPS project, https://ec.europa.eu/defence-industry-space/ussps_en

215 Layla (2020a, 5 August) 'Mozambique, enquête sur les opérations franco-émiraties au Cabo Delgado', Les arcanes de la géostratégie. https://laylamind.home.blog/2020/08/05/mozambique-enquete-sur-les-operations-franco- emiraties/

216 Layla (2020b, 21 October) 'Tanzanie-Bassin Rovuma : insurrection opportune ?', Les arcanes de la géostratégie. https://laylamind.home.blog/2020/10/21/tanzanie-bassin-rovuma-insurrection-opportune/

217 RFI (2021, 8 August) 'Projet de coup d'état à Madagascar : le président s'interroge sur le rôle de la France'. https:// www.bfmtv.com/international/afrique/projet-de-coup-d-etat-a-madagascar-le-president-s-interroge-sur-le-role- de-la-france_AD-202108080194.html

218 'Schiebel Camcopter S-100 Fully Integrated to French Navy Ship Dixmude'. UAS weekly.com, 20 November 2019. https://uasweekly.com/2019/11/20/schiebel-camcopter-s-100-fully-integrated-to-french-navy-ship-dixmude/

219 Vincent Groizeleau, "Des drones Schiebel pour les Ocean Eagle 43 du Mozambique", Mer et Marine, 6 avril 2016, https://www.meretmarine.com/fr/content/des-drones-schiebel-pour-les-ocean-eagle-43-du-mozambique

220 Ministère des armées (2020, 26 August) 'Barkhane : Task Force Takuba – Les premiers entrainements franco- estoniens ont débuté'. https://www.defense.gouv.fr/actualites/operations/barkhane-task-force-takuba-les- premiers-entrainements-franco-estoniens-ont-debute'; Radio Prague International (n.d.) 'Mali: les soldats tchèques de la Force Takuba sur place en février'. https://francais.radio.cz/mali-les-soldats-tcheques-de-la-force- takuba-sur-place-en-fevrier-8704173

221 Fortin, T. and Mohamed, W. (2017) 'Comment la France participe à la guerre contre le Yémen'. Orient XXI, 12 September. https://orientxxi.info/magazine/comment-la-france-participe-a-la-guerre-contre-le-yemen,1990

222 Minister for Defence Simon Coveney TD (hereafter 'Minister Coveney') Written Answers Defence Forces Expenditure Dáil Éireann Debate, 25 February 2021. https://www.oireachtas.ie/en/debates/ question/2021-02-25/147/

223 Stockholm International Peace Research Institute (SIPRI) (n.d.) Yearbook: Armaments, Disarmament and International Security. https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS

224 'About the Commission', 22 January 2021. https://www.gov.ie/en/publication/88a81-about-the-commission/

225 Minister of State Paul Kehoe TD (2019) 'Written Answer', 7 November 2019. https://www.oireachtas.ie/en/ debates/question/2019-11-07/29/; See also Feasibility Study, op cit, p.16.

226 See https://twitter.com/irishdefencesec/status/1463847879139860488. The Irish Defence and Security Association describes itself as 'Irish or Irish-based SMEs, Research Organizations and Multinational Corporations who share concerns about Ireland's vulnerability'. https://defenceandsecurity.ie

227 Dillon, E. (2020) 'Ireland's arms trade now worth €42m a year despite strict licensing controls over exports'. Sunday World, 20 October. https://www.sundayworld.com/news/irish-news/irelands-arms-trade-now-worth- 42m-a-year-despite-strict-licensing-controls-over-exports-39646109.html; See also Dubsky, E. (2018, 27 January) Business is Booming for Ireland's Arms Trade. https://medium.com/@eoin/business-is-booming-for-irelands- arms-trade-4515e0acc991

228 Minister Coveney (2021, 25 November) 'EU Funding for Irish Defence and Security Enterprise and R&D – Maximising the Opportunities', Press release. https://www.gov.ie/en/press-release/c8d2c-eu-funding-for-irish-defence-and-security-enterprise-and-rd-maximising-the-opportunities

229 Capt Catherine Barrett 'The rise of the EU as a security and defence power, and the positive implications for Ireland'. Irish Defence Review 2020. Dublin: Military Authorities, p.164. https://www.military.ie/en/public-information/publications/defence-forces-review/review-2020.pdf

230 https://ec.europa.eu/defence-industry-space/system/files/2021-06/EDIDP2020_factsheet_MSC_NS_USSPS.pdf. The Company was founded in 2013 and one of its directors is Bernard Allen, a former Fine Gael TD for Cork who chaired the Dáil Public Affairs Committee and was Minister for Youth and Sport between 1994 and 1997. https://www.aianalytics.ie/team.html

231 Community-Based Policing and Post-Conflict Police Reform (Horizon 2020–2015-20) and Smart Resilience Indicators for Smart Critical Infrastructures (also Horizon 2020–2016-19). https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/943609890

232 'There are opportunities for Ireland to access funding through companies in the dual-use product and technology sectors'. Minister of State Paul Kehoe TD, Written Answer 7 November 2019. https://www.oireachtas.ie/en/debates/question/2019-11-07/29/

233 Minister Coveney (2012) 'EU Funding for Irish Defence and Security Enterprise and R&D – Maximising the Opportunities', Press release, 25 November. https://www.gov.ie/en/press-release/c8d2c-eu-funding-for-irish-defence-and-security-enterprise-and-rd-maximising-the-opportunities

234 Ibid.

235 Department of Defence, Ireland (2020) Feasibility Study: Establishment of a Research, Technology & Innovation Capability for the Irish Defence Organisation; Final Report, September. https://assets.gov.ie/123760/f091d8ff-fd61-4e71-84ff-9fd4e9a41391.pdf

236 Support for Enterprise, Research and Innovation in Defence: RTI Unit in Defence,25 November 2021. https://www.gov.ie/en/publication/8aa95-support-for-enterprise-research-and-innovation-in-defence

237 Cusack, A. (2021) 'Helping to blaze a trail for women in the defence forces', Westmeath Independent, 7 March. https://www.westmeathindependent.ie/2021/03/07/helping-to-blaze-a-trail-for-women-in-the-defence-forces/

238 Department of Defence, Ireland, p. 2.

239 Department of Business, Enterprise and Innovation (2019) Innovation 2020, Fourth Progress Report, July 2019, p. 4. https://enterprise.gov.ie/en/Publications/Publication-files/Innovation-2020-Fourth-Progress-Report.pdf

240 The DEF built on arrangements dating from 2011 whereby 'Enterprise Ireland would support the Department of Defence and the Defence Forces capability development through engagement with Irish-based enterprise and research institutes on the use and application of innovative civilian technologies in the military sphere'. Minister Coveney, Written Answers Departmental Bodies, Dáil Éireann Debate, Tuesday 17 November 2020. https://www.oireachtas.ie/en/debates/question/2020-11-17/70/. The Strategy was agreed and approved in May 2019. https://www.gov.ie/pdf/138812/

241 Innovation 2020, Fourth Progress Report, Action No. 4.26, p.65 and Action No. 4.25, p.64

242 https://www.dfa.ie/media/dfa/publications/JPOA--24-August-2021-Engish-Version.pdf

243 https://www.dfa.ie/media/dfa/newsmedia/Second-DEU-IRL_Joint-Plan-of-Action---Final-Jan-2021.pdf

244 'I would like to congratulate Ireland for the increased interest on the defence side towards the EU and the EDF (European Defence Fund)', Jan Pie, head of the AeroSpace and Defence Industries Association of Europe told a Department of Defence-hosted webinar on Thursday aimed at linking Irish small and medium enterprise (SMEs) with European funding opportunities in the sector'. Cited in Hilliard. M. (2021) 'Ireland's "increased interest" In European Defence Cooperation welcomed'. Irish Times, 25 November. https://www.irishtimes.com/news/ireland/irish-news/ireland-s-increased-interest-in-european-defence-cooperation-welcomed-1.4739089

245 Olli Ruutu (2021) Deputy Chief Executive, European Defence Agency Opening Statement Before The Irish Parliament Joint Committee On European Union Affairs To Discuss The EU Cybersecurity Strategy (24 November 2021). https://data.oireachtas.ie/ie/oireachtas/committee/dail/33/joint_committee_on_european_union_affairs/submissions/2021/2021-11-24_opening-statement-olli-ruutu-deputy-chief-executive-european-defence-agency_en.pdf

246 Minister Coveney, Written Answer, 8 October 2020. https://www.oireachtas.ie/en/debates/question/2020-10-08/34/

247 Submission by the Department of Foreign Affairs to the Commission on the Defence Forces, 28 May 2021. https://assets.gov.ie/136318/f80afe5d-11f4-436b-9b6b-ce2a1d539b4d.pdf

248 Dáil Éireann debate 7 December 2017 Vol. 962 No. 8. https://www.oireachtas.ie/en/debates/debate/dail/2017-12-07/38/

249 Baciu, C.-A. (2018) 'What will EU defence project PESCO mean for Ireland?', RTE News 13 April. https://www.rte.ie/brainstorm/2018/0412/954015-what-will-eu-defence-project-pesco-mean-for-ireland/. See also Baciu, A.-C. (2018) 'Security transformation and multilateralism: The future of Irish defence and foreign policy'. Irish Studies in International Affairs, 29: 97–117. https://doi.org/10.3318/isia.2018.29.05

250 Barrett, Irish Defence Review 2020, p.165.

251 The Economist (2020, 18 July) 'Charlemagne, how Ireland gets its way'. https://www.economist.com/europe/2020/07/18/how-ireland-getsits-way

252 Minister Coveney, Written Answers European Defence Action Plan. Dáil Éireann Debate, 8 October 2020. https://www.oireachtas.ie/en/debates/question/2020-10-08/34/

253 For example, Duffy, R. (2019, 18 May) 'Irish MEPs have been raising concerns of a future "EU Army" – but is it likely to happen?' The Examiner. https://www.thejournal.ie/eu-army-factfind-4635381-May2019/; Clare Daly MEP 'European Defence Fund – Plenary speech 29 April 2021'. https://claredaly.ie/issues/defence/european-defence-fund-plenary-speech/; Byrne, P. (2021) '"We don't support Russia or China. We support peace" – Mick Wallace on opposing EU militarisation and "US financial supremacy"'. Wexford People. https://www.independent.ie/regionals/wexford/news/big-interview-we-dont-support-russia-or-china-we-support-peace-mick-wallace-on-opposing-eu-militarisation-and-us-financial-supremacy-40646230.html; Lynn Boylan, EU Militarisation in The European Union - Democracy or Empire. https://www.pana.ie/download/EU_Democracy_Empire.pdf; See also PESCO, Irish Neutrality and the Militarisation of the EU, The People's Movement and Afri – Action from Ireland, Dublin, January 2019. https://www.people.ie/peace/pesco.pdf>

254 19 February 2019 Dáil Debates Vol. 979 No. 5. https://www.oireachtas.ie/en/debates/debate/dail/2019-02-19/30/

255 22 April 2021 Dáil Debates Vol. 1006 No. 1. https://www.oireachtas.ie/en/debates/debate/dail/2021-04-22/8/

256 ICTU Congress letter to political party leaders, January 2020. https://www.ictu.ie/news/irish-participation-pesco-european-defence-co-operation-entity

257 12 October 2021 Defence Questions Response by Minister Coveney to Deputy Peadar Tóibín; https://www.oireachtas.ie/en/debates/question/2021-10-12/235/>)

258 Minister Coveney at the 25 November 2021 seminar

259 https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3728

260 https://www.oireachtas.ie/en/debates/question/2021-09-30/236/

261 Ministerie van Defensie (2019, 13 May) 'Beantwoording schriftelijke vragen over de Raad Buitenlandse Zaken met de ministers van Defensie op 14 mei 2019 te Brussel'. https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/kamerstukken/2019/05/13/beantwoording-kamervragen-over-raad-buitenlandse-zaken-met-ministers-van-defensie/beantwoording-kamervragen-over-raad-buitenlandse-zaken-met-ministers-van-defensie.pdf

262 Akkerman, M. (2021) 'Overheid omarmt wapenindustrie steeds meer'. Vredesspiraal. https://stopwapenhandel.org/overheid-omarmt-wapenindustrie-steeds-meer/

263 Rijksdienst voor Ondernemend Nederland (2020, 28 August) Europees Defensie Fonds, https://www.rvo.nl/onderwerpen/innovatief-ondernemen/europees-defensie-fonds; Example of a meeting: Netherlands Enterprise Agency (2021) 'European Defence Fund Information Day - 7 October 2021'. https://english.rvo.nl/news/events/european-defence-fund-information-day

264 NIDV (2021, 19 August) 'Directeur NIDV benoemd in EC Expert Group'. https://www.nidv.eu/nieuws/directeur-nidv-benoemd-in-ec-expert-group/; Also see: European Commission - Directorate-General Defence Industry and Space (2021) 'Informal Commission Expert Group on Policies and Programmes Relevant to EU Space, Defence, and Aeronautics Industry - Terms of Reference'. https://ec.europa.eu/transparency/expert-groups-register/core/api/front/expertGroupAddtitionalInfo/41965/download

265 https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3775

266 Tweede Kamer (2018, 9 November) 'Nieuwe Commissievoorstellen en initiatieven van de lidstaten van de Europese Unie - Lijst van vragen en antwoorden', 22112 - Nr. 2719. https://zoek.officielebekendmakingen.nl/kst-22112-2719.html

267 Wester, R., Pennekamp, B. and Vuijk, R. (2021) 'Werken aan succesvolle Europese defensiesamenwerking'. Berenschot, 18 February. http://docplayer.nl/216233644-Werken-aan-succesvolle-europese-defensiesamenwerking-door-robert-wester-ronald-vuijk-en-bram-pennekamp.html; Tweede Kamer (16 May 2019) 'Defensieraad - Verslag van een schriftelijk overleg', 21501-28 - nr. 188. https://zoek.officielebekendmakingen.nl/kst-21501-28-188.html

268 Tweede Kamer (2021, 21 September) 'Vaststelling van de begrotingsstaten van het Ministerie van Economische Zaken en Klimaat (XIII) voor het jaar 2022', 35 925 XIII - Nr. 1. https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/begrotingen/2021/09/21/xiii-economische-zaken-en-klimaat-rijksbegroting-2022/13+Economische+zaken+en+Klimaat.pdf

269 Tweede Kamer (2020, 18 August) 'Beantwoording vragen van het lid Bosman (VVD) aan de Minister van Defensie over financiering onder het European Defence Fund'. https://zoek.officielebekendmakingen.nl/ah-tk-20192020-3790.html

270 Tweede Kamer (2021, 22 January) 'Defensieraad - Brief van de Minister van Defensie', 21 501-28 - Nr. 215. https://zoek.officielebekendmakingen.nl/kst-21501-28-188.html

271 Nulkes, R. (2021) 'Tweede Kamerverkiezingen'. NIDV Magazine, 2021-1. https://www.nidv.eu/wp-content/uploads/2021/02/NIDV-Magazine-2021-1-DEF.pdf

272 Tweede Kamer (2021, 5 March) 'Initiatiefnota van de leden Bosman en Van Helvert over een gelijk speelveld bij exportvergunningen voor de Europese defensie-industrie', 35 753 – Nr. 2. https://www.tweedekamer.nl/downloads/document?id=8a3bf33d-9e15-4c74-b782-68362edc89d0&title=Initiatiefnota%20.pdf

273 The chapter is based on previous analyses including De Fortuny, T. and Bohigas. X. (2019) The European Defence Fund. Working Papers. Barcelona: Centre Delàs. It expands the scope beyond the EDF to all currently funded projects.

274 Commission implementing decision on the financing of the European Defence Industrial Development Programme and the adoption of the work programme for the years 2019 and 2020. Annex to the EC 2019 Call, document C (2019) 2205. https://ec.europa.eu/docsroom/documents/34515/attachments/3/translations/en/renditions/native

275 This may be understood to mean innovative equipment for soldiers including portable elements for their protection, for observation and communications, and also including offensive attack systems. The language used here reflects that of the call where it was published.

276 CROWN project information. https://eda.europa.eu/docs/default-source/padr/padr-crown-projectweb_v1.pdf and https://eda.europa.eu/news-and-events/news/2021/07/20/crown-european-multifunction-radiofrequency-system-project-launched - also from the project coordinator, Indra: https://www.indracompany.com/en/indra/crown-european-active-electronically-scanned-array-combined-radar-communications-electronic

277 GOSSRA project information. https://gossra.net/ ; https://eda.europa.eu/docs/default-source/documents/padr-gossra-projectweb_v4.pdf . Information from some partners. https://www.gmv.com/en/Company/Communication/News/2020/03/GOSSRA.html; and https://www.indracompany.com/en/indra/gossra-generic-open-soldier-system-reference-architecture

278 See for instance https://eda.europa.eu/news-and-events/news/2021/02/05/ocean2020-tested-ahead-of-new-live-demonstration

279 https://ocean2020.eu/; and simulation trial. https://eda.europa.eu/news-and-events/news/2021/03/29/third-simulation-trial-for-ocean2020-project

280 . https://eda.europa.eu/docs/default-source/padr/20200329_padr-optimise-projectweb.pdf and https://eda.europa.eu/news-and-events/news/2021/04/26/launch-of-the-padr-project-optimise

281 Official EU information on the DECISMAR Project. https://ec.europa.eu/commission/presscorner/api/files/attachment/865729/EDIDP%20-%20DECISMAR.pdf.pdf

282 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1089

283 SEA Defence Project information. https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1092

284 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1082

285 PYTHIA: http://www.pythia-padr.eu/

286 SOLOMON is complementary to the PYTHIA project: http://www.solomon-padr.eu/

287 By providing methods, cognitive biases, solutions practical recommendations, and a concrete example. See Deliverable 2.4, PYTHIA project. http://www.pythia-padr.eu/

288 Porter, M. (2001) 'The value chain and competitive advantage', in D. Barnes (Ed.), Understanding Business: Processes. Routledge, pp. 50–66.

289 http://mecatron.rma.ac.be/index.php/projects/solomon/

290 https://eda.europa.eu/docs/default-source/padr/20210601_padr-interact-projectweb_v1.pdf; and https://eda.europa.eu/news-and-events/news/2021/06/25/new-r-d-project-to-focus-on-interoperability-standards-for-unmanned-systems

291 The official EU information available on the four projects DECISMAR, ECYSAP, ESC2, and DRONEDGE-E (26 August 2021). For DECISMAR. https://ec.europa.eu/commission/presscorner/detail/en/FS_20_1078; ECYSAP. https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1080 ; ESC2. https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1081; and for DRONEDGE-E. https://ec.europa.eu/commission/presscorner/detail/en/FS_20_1079

292 The DRONEDGE-E project has several incoherent definitions. As a simulation study that does not include the design of prototypes, its description includes phrases like 'automatic generation of algorithms through artificial intelligence' and the 'control of swarms of drones in real-time with no single point of failure'. It is unclear whether the automatic generation of algorithms through AI is just part of the planned study; but the control of anything 'with no single point of failure' is impossible, as technical texts state.

293 DECISMAR implements part of the 'Upgrade of maritime surveillance' PESCO Project. https://pesco.europa.eu/project/upgrade-of-maritime-surveillance/; ECYSAP and ESC2 implement part of the 'Strategic Command and Control (C2) System for CSDP Missions and Operations' PESCO Project. https://pesco.europa.eu/project/strategic-c2-system-for-csdp-missions-and-operations/; EUDAAS implements part of the 'European MALE RPAS' PESCO Project. https://pesco.europa.eu/project/european-medium-altitude-long-endurance-remotely-piloted-aircraft-systems-male-rpas-eurodrone/; and PANDORA implements part of the 'Cyber Threats and Incident Response Information Sharing Platform (CTISP)' PESCO Project. https://pesco.europa.eu/project/cyber-threats-and-incident-response-information-sharing-platform/

294 http://www.acamsii.eu/

295 VESTLIFE project webpage. http://vestlife-project.eu/

296 https://europa.eu/newsroom/content/metamask_en - also
https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1096

297 https://eda.europa.eu/docs/default-source/documents/padr-exceed-projectweb_v1.pdf; and
https://www.indracompany.com/en/indra/exceed-trusted-flexible-system-chip-european-defence-applications

298 https://eda.europa.eu/docs/default-source/padr/20210330_padr-pilum-projectweb.pdf; and https://eda.europa.
eu/news-and-events/news/2021/04/28/padr-pilum-project-gets-started

299 https://www.talos-padr.eu/; and https://eda.europa.eu/docs/default-source/documents/padr-talos-project.pdf

300 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1087

301 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1094; and ARTUS. https://ec.europa.eu/
commission/presscorner/detail/en/fs_20_1095 and https://eda.europa.eu/news-and-events/news/2021/02/10/
padr-artus-project-kicks-off

302 https://europa.eu/newsroom/content/privilege_en

303 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1100

304 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1083; FITS4TOP reference to the TOP gun in its
title is somewhat strange. https://www.digitalspy.com/movies/a863515/top-gun-mistakes-technical-blunders/

305 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1084

306 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1085

307 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1086; and https://www.epicos.com/article/592898/
ide-leader-european-defense-programs-lotus-and-smotanet-be-funded-edidp

308 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1088; and https://www.businesswire.com/news/
home/20201216005852/en/SATLANTIS-Kick-starts-the-First-Project-Under-the-European-Defence-Industrial-
Development-Programme-EDIDP

309 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1090

310 An escort-jamming POD is an interference and electronic attack POD, usually located under the wings, for aerial
escort missions.

311 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1101

312 https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1093; and https://www.epicos.com/article/592898/
ide-leader-european-defense-programs-lotus-and-smotanet-be-funded-edidp

313 ECYSAP and ESC2 (discussed in the Basic Tools Section) implement part of the 'Strategic Command and Control
(C2) System for CSDP Missions and Operations' PESCO Project. https://pesco.europa.eu/project/strategic-
c2-system-for-csdp-missions-and-operations/; GEODE implements part of the 'EU Radio Navigation Solution'
PESCO Project: https://pesco.europa.eu/project/eu-radio-navigation-solution-euras/ ; iMUGS implements part
of the 'Integrated Unmanned Ground System (UGS)' PESCO Project: https://pesco.europa.eu/project/integrated-
unmanned-ground-system-ugs/ ; LinkEUs implements part of the 'EU Beyond Line Of Sight (BLOS) Land Battlefield
Missile Systems' PESCO Project: https://pesco.europa.eu/project/eu-beyond-line-of-sight-blos-land-battlefield-
missile-systems/ ; PANDORA (discussed in the Basic Tools Section) implements part of the 'Cyber Threats and
Incident Response Information Sharing Platform (CTISP)' PESCO Project: https://pesco.europa.eu/project/cyber-
threats-and-incident-response-information-sharing-platform/ ; REACT implements part of the 'Airborne Electronic
Attack (AEA)' PESCO Project: https://pesco.europa.eu/project/airborne-electronic-attack-aea/ .

314 https://europa.eu/european-union/about-eu/eu-in-brief_en

315 Verbruggen, M. (2019) 'On swarm systems', SIPRI & EU Non-Proliferation and Disarmament Consortium.
https://www.sipri.org/sites/default/files/2019-12/eunpdc_no_65_031219.pdf

316 'Novel weapons against ethics and people. Armed Drones and Autonomous Drones'. Report 39. Delàs Center for
Peace Sutudies, p. 23. http://centredelas.org/publicacions/informe-39-noves-armes-contra-letica-i-les-persones-
drons-armats-i-drons-autonoms/?lang=en

317 Automation bias is the human tendency to take for granted what machines propose. Even if the system has
means to stop the robotic weapon, operators may simply follow the actions proposed by robotic systems,
without thinking or deciding to stop them.

318 According to Noel Sharkey, automation bias means that 'operators are predisposed to accept computer
recommendations without seeking any other information to confirm them. The added temporary pressure
causes operators to fall into all the pitfalls of automatic reasoning: instead of thinking, they tend to believe
and accept what the machine proposes; then, operators ignore ambiguity, suppress doubt, invent causes and
intentions, focus on existing evidence and ignore absent evidence that they would have to look for': Sharkey,
N. (2014) 'Towards a principle for the human supervisory control of robot weapons'. UNOG. https://www.
unog.ch/80256EDD006B8954/(httpAssets)/2002471923EBF52AC1257CCC0047C791/$file/Article_Sharkey_
PrincipleforHumanSupervisory.pdf

319 One can imagine a scenario in which some of the technologies companies have already developed (albeit
confidentially) are presented as project deliverables, in a risk-free funding operation. This is not new in EU
projects and is unlikely to be any different in EDIDP future projects. On lobbying to get topics incorporated in
the Calls and then proposing projects on these topics, even the names of some 2019 EDIDP projects match the
wording of the Call topics.

320 Fu-Lee, K. (2021) 'The third revolution in warfare'. The Atlantic, 11 September. https://www.theatlantic.com/technology/archive/2021/09/i-weapons-are-third-revolution-warfare/620013/

321 Treaty of the European Union – Consolidated version (2012). http://data.europa.eu/eli/treaty/teu_2012/oj

322 European Parliament resolution of 12 September 2018 on autonomous weapon systems (2018/2752(RSP)). https://www.europarl.europa.eu/doceo/document/TA-8-2018-0341_EN.html

323 Guidelines for Military and non-military use of Artificial Intelligence (2021). https://www.europarl.europa.eu/news/es/press-room/20210114IPR95627/guidelines-for-military-and-non-military-use-of-artificial-intelligence

324 European Commission (21 April 2021) Proposal for a regulation laying down harmonized rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts Brussels. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0206&from=EN

325 UN Office for Disarmament Affairs, Treaty on the Prohibition of Nuclear Weapons. https://www.un.org/disarmament/wmd/nuclear/tpnw/

326 Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977. Article 36: https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/ART/470-750045?OpenDocument

327 Etat-Major de la Défense, Ordre Général - J/836 (18 July 2002), establishing La Commission d'Evaluation Juridique des nouvelles armes, des nouveaux moyens et des nouvelles méthodes de guerre [Committee for the Legal Review of New Weapons, New Means and New Methods of Warfare].

328 Förordning om folkrättslig granskning av vapenproject [Ordinance on international law review of arms projects], Swedish Code of Statutes, SFS 1994:536.

329 Beschikking van de Minister van Defensie [Directive of the Minister of Defence] nr. 458.614/A, 5 May 1978, establishing the Adviescommissie Internationaal Recht en Conventioneel Wapengebruik [Committee for International Law and the Use of Conventional Weapons].

330 A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977, January 2006. https://www.icrc.org/en/doc/assets/files/other/irrc_864_icrc_geneva.pdf

331 Further information on the Martens Clause may be found on the ICRC website: https://casebook.icrc.org/glossary/martens-clause

332 Ibid.

333 Sandoz, Y., CSwinarski, C. and Zimmermann, B. (Eds.) (987) Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949. Geneva: ICRC/Martinus Nijhoff, p. 39 (para. 55); Singh, N. and McWhinney, E. (1989) Nuclear Weapons and Contemporary International Law, 2nd edn. Dordrecht: Martinus Nijhoff, pp. 46–47.

334 PADR (2017) Programme Guidance on How to complete your self-assessment on 'ethics, legal and societal aspects (ELSA)'. https://ec.europa.eu/research/participants/data/ref/other_eu_prog/other/pppa/guide/pse/pa-guide-elsa-sa-padr_en.pdf

335 AsktheEU. https://www.asktheeu.org/en/request/elsa_reviews_project_proposals

336 Ibid.

337 The 'Submission and Evaluation of Proposals Tool' (SEP).

338 Parliamentary questions (4 March 2020). https://www.europarl.europa.eu/doceo/document/E-9-2019-003854-ASW_EN.html

339 https://www.asktheeu.org/en/request/7976/response/26700/attach/4/L%20Gestdem%202020%203149%20Bram%20Vranken%20A3.pdf?cookie_passthrough=1

340 Ibid Ask the EU

341 European Ombudsman (2020) Decision in case 1839/2020/OAM. https://www.ombudsman.europa.eu/en/decision/en/139074

342 European Ombudsman (2020) Decision in case 1839/2020/OAM. https://www.ombudsman.europa.eu/en/decision/en/139074

343 https://ihl-databases.icrc.org/ihl

344 Charter of Fundamental Rights of the European Union. https://www.europarl.europa.eu/charter/pdf/text_en.pdf

345 Ibid. Furthermore, this is reflected in the 1948 Universal Declaration of Human Rights, which is binding under customary international law.

346 Science and Environmental Health Network (1998) Wingspread Conference on the Precautionary Principle. There are five key elements that make up this principle: (i) Taking anticipatory action to prevent harm in the face of scientific uncertainty; (i) Exploring alternatives, including the alternative of 'no action'; (iii) Considering the full cost of environmental and health impacts over time; (iv) Increasing public participation in decisión-making; and (v) Placing responsibility for providing evidence to the proponents of an activity.

347 Holland, J.S. (2015). 'How drones are affecting wildlife in surprising ways'. National Geographic, 8 August. https://www.nationalgeographic.com/animals/article/150825-drones-animals-wildlife-bears-science-technology Mulero-Pazmany, M. et al. (2017) 'Unmanned aircraft systems as a new source of disturbance for wildlife: A systematic review'. PlosONE, 12(6) https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0178448&type=printable Sandbrook C. (2015) 'The social implications of using drones for biodiversity conservation'. Ambio, 44(Suppl 4): 636–647. https://doi.org/10.1007/s13280-015-0714-0

348 EC (2021) Innovation Principle.

349 UNODC (n.d.) 'Core Principles of IHL'. https://www.unodc.org/e4j/en/terrorism/module-6/key-issues/core-principles-of-ihl.html

350 ICRC (n.d.) 'Fundamental Principles of IHL'. https://casebook.icrc.org/glossary/fundamental-principles-ihl

351 Dominguez (2018) El Pais. /Estupidez Artificial: El problema que nadie vió venir'. https://elpais.com/elpais/2018/11/15/ciencia/1542314780_296201.html Robust Physical-World Attacks on Deep Learning Visual Classification https://arxiv.org/pdf/1707.08945.pdf

352 PADR ethics CRs/SRs for the ethics assessment. https://www.asktheeu.org/en/request/6787/response/21903/attach/10/Tpl%20Draft%20Ethics%20CR%20and%20SR%20PADR%20v3.pdf?cookie_passthrough=1

353 Consensus Report (1) 2017 https://www.asktheeu.org/en/request/6787/response/21903/attach/11/2017%2011%2003%20SFT2%20ELSA%20Consensus%20Report%20redacted.pdf?cookie_passthrough=1

354 Consensus Report (2) 2017https://www.asktheeu.org/en/request/6787/response/21903/attach/12/2017%2011%2003%20STF1%20ELSA%20Consensus%20Report%20redacted.pdf?cookie_passthrough=1

355 Consensus Report (3) 2018https://www.asktheeu.org/en/request/6787/response/21903/attach/13/2018%2001%2011%20FPSS1%20ELSA%20CR%20redacted.pdf?cookie_passthrough=1

356 Consensus Report (4) 2018 https://www.asktheeu.org/en/request/6787/response/21903/attach/14/2018%2001%2011%20FPSS2%20ELSA%20CR%20redacted.pdf?cookie_passthrough=1

357 Consensus Report (5) 2018 https://www.asktheeu.org/en/request/6787/response/21903/attach/15/2018%2001%2011%20FPSS3%20ELSA%20CR%20redacted.pdf?cookie_passthrough=1

358 Consensus Report (6) 2018 https://www.asktheeu.org/en/request/6787/response/21903/attach/16/2018%2001%2011%20FPSS4%20ELSA%20CR%20redacted.pdf?cookie_passthrough=1

359 Consensus Report (7) 2018 https://www.asktheeu.org/en/request/6787/response/21903/attach/17/2018%2001%2011%20FPSS5%20ELSA%20CR%20redacted.pdf?cookie_passthrough=1

360 Consensus Report (8) 2018 https://www.asktheeu.org/en/request/6787/response/21903/attach/18/2018%2001%2011%20FPSS6%20ELSA%20CR%20redacted.pdf?cookie_passthrough=1

361 Consensus Report (9) 2017 https://www.asktheeu.org/en/request/6787/response/21903/attach/21/20171127%20PADR%20US1%20ELSA%20Review%20CR%20vFinal%20redacted.pdf?cookie_passthrough=1

362 Consensus Report (10) 2017https://www.asktheeu.org/en/request/6787/response/21903/attach/22/20171127%20PADR%20US2%20ELSA%20Review%20CR%20vFinal%20redacted.pdf?cookie_passthrough=1

363 Ethics guidelines for trustworthy AI. https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai

364 Ibid.

365 Knefel, J. (2015) 'The Airforce wants you to trust robots. Should you?' Scientific American. https://www.scientificamerican.com/article/the-air-force-wants-you-to-trust-robots-should-you/

366 DataBricks (n.d.) 'Automation Bias'. https://databricks.com/glossary/automation-bias

367 DataBricks (n.d.) 'Automation Bias'. https://databricks.com/glossary/automation-bias

368 page 34 of the ethical guidliness https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai

369 Big Brother Watch (2018) Face Off. https://bigbrotherwatch.org.uk/wp-content/uploads/2018/05/Face-Off-final-digital-1.pdf

370 Rodríguez Álvarez, J.. (2020) 'Guerra trans-especie: Animales en conflicto humano'. Derecho Animal [Forum of Animal Law Studies], 11(3): 65–67. https://doi.org/10.5565/rev/da.509

371 SGR (2021) Under the Radar: the carbon footprint of Europe's military sectors. https://www.sgr.org.uk/publications/under-radar-carbon-footprint-europe-s-military-sectors

tni
transnational institute
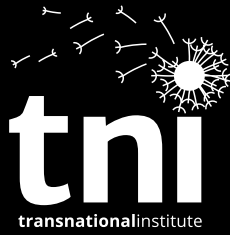
The Transnational Institute (TNI) is an international research and advocacy institute committed to building a just, democratic and sustainable planet. For more than 40 years, TNI has served as a unique nexus between social movements, engaged scholars and policy makers.

www.TNI.org

ENAAT
european network against arms trade

The European Network Against Arms Trade (ENAAT) is an informal network of European peace groups working together in research, advocacy and campaigning. ENAAT members consider that arms trade is a threat to peace, security and development, and that the arms industry is a driving force behind increasing military exports and expenditure. Since 2016 the ENAAT EU project has been scrutinising EU budget lines for military research and development.

www.enaat.org

Stop Wapenhandel

Stop Wapenhandel is an independent research and campaign organisation opposed to the arms trade and the arms industry. It campaigns against arms exports to poor countries, undemocratic regimes and countries in conflict areas. It also stands against the financing of the arms trade by governments, banks and pension funds.

www.stopwapenhandel.org

In collaboration with

SWI Shadow World Investigations

Observatoire des armements

CENTRE DELÀS D'ESTUDIS PER LA PAU

TNI's **War and Pacification** programme concerns the nexus between militarisation, security and globalisation, confronting the structures and interests that underpin a new era of permanent war. The Border Wars series looks at the globalisation of border security, examining the policies that put economic interests and security above human rights, as well as the corporate interests that drive this agenda and profit from it.

Sign up to receive receive regular updates from this project and TNI at www.tni.org/subscribe